

- (F) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.
 - (G) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.
 - (H) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.
 - (I) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.
 - (J) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:
 - (i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and
 - (ii) any discing or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities, and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (g)(1)(H)(i). The provisions this clause shall not exempt the owner of any property from stabilizing, in accordance with paragraph (d)(2), disturbed surface areas which have been created as a result of the weed abatement actions.
 - (K) sandblasting operations.
- (2) The provisions of paragraphs (d)(1) and (d)(3) shall not apply:
- (A) When wind gusts exceed 25 miles per hour, provided that:

- (i) The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;
 - (ii) records are maintained in accordance with subparagraph (e)(1)(C).
 - (B) To unpaved roads, provided such roads:
 - (i) are used solely for the maintenance of wind-generating equipment; or
 - (ii) are unpaved public alleys as defined in Rule 1186; or
 - (iii) are service roads that meet all of the following criteria:
 - (a) are less than 50 feet in width at all points along the road;
 - (b) are within 25 feet of the property line; and
 - (c) have a traffic volume less than 20 vehicle-trips per day.
 - (C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.
- (3) The provisions of (d)(2) shall not apply to any aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards of paragraphs (d)(1) and (d)(3) can not be met through use of Table 2 actions.
- (4) The provisions of paragraphs (d)(1), (d)(2), and (d)(3) shall not apply to:
- (A) Blasting operations which have been permitted by the California Division of Industrial Safety; and
 - (B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.
- (5) The provisions of paragraph (d)(3) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for

each applicable fugitive dust source type. To qualify for this exemption, a person must maintain records in accordance with subparagraph (e)(1)(C).

- (6) The provisions of paragraph (d)(4) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles provided that such roadway is closed to through traffic and visible roadway dust is removed within one day following the cessation of activities.
- (7) The provisions of subdivision (e) shall not apply to:
 - (A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.
 - (B) any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance.
 - (C) any large operation subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.
- (8) The provisions of subparagraph (e)(1)(A) through (e)(1)(C) shall not apply to any large operation with an AQMD-approved fugitive dust control plan provided that there is no change to the sources and controls as identified in the AQMD-approved fugitive dust control plan.

(h) Fees

Any person conducting active operations for which the Executive Officer conducts upwind/downwind monitoring for PM₁₀ pursuant to paragraph (d)(3) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is exempted from paragraph (d)(3) or meets the requirements of paragraph (d)(3).

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Backfilling	01-1 Stabilize backfill material when not actively handling; and	✓ Mix backfill soil with water prior to moving to dedicate water truck or high capacity hose to backfilling equipment
	01-2 Stabilize backfill material during handling; and	✓ Empty loader bucket slowly so that no dust plumes are generated
	01-3 Stabilize soil at completion of activity.	✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and	✓ Maintain live perennial vegetation where possible
	02-2 Stabilize soil during clearing and grubbing activities; and	✓ Apply water in sufficient quantity to prevent generation of dust plumes
	02-3 Stabilize soil immediately after clearing and grubbing activities.	
Clearing forms	03-1 Use water spray to clear forms; or	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
	03-2 Use sweeping and water spray to clear forms; or	
	03-3 Use vacuum system to clear forms.	
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity
	04-2 Stabilize material after crushing.	✓ Apply water to crushed material to prevent dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	<ul style="list-style-type: none"> ✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration of cut prior to subsequent cuts ✓ Use water trucks/pulls to water soils to depth of cut
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	<ul style="list-style-type: none"> ✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	<ul style="list-style-type: none"> ✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	<ul style="list-style-type: none"> ✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	<ul style="list-style-type: none"> ✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	<ul style="list-style-type: none"> ✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	<ul style="list-style-type: none"> ✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	<ul style="list-style-type: none"> ✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	<ul style="list-style-type: none"> ✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	<ul style="list-style-type: none"> ✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	<ul style="list-style-type: none"> ✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	<ul style="list-style-type: none"> ✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	<ul style="list-style-type: none"> ✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	<ul style="list-style-type: none"> ✓ Haul waste material immediately off-site

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Unpaved roads/parking lots	19-1 Stabilize soils to meet the applicable performance standards; and	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
	19-2 Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	
Vacant land	20-1 In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

Table 2
DUST CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS
Earth-moving (except construction cutting and filling areas, and mining operations)	<p>(1a) Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR</p> <p>(1a-1) For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.</p>
Earth-moving: Construction fill areas:	<p>(1b) Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.</p>

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS
Earth-moving: Construction cut areas and mining operations:	(1c) Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b) Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c) Apply chemical stabilizers within five working days of grading completion; OR (2d) Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a) Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR (3b) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR (3c) Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR (3d) Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS
Unpaved Roads	<p>(4a) Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR</p> <p>(4b) Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR</p> <p>(4c) Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.</p>
Open storage piles	<p>(5a) Apply chemical stabilizers; OR</p> <p>(5b) Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR</p> <p>(5c) Install temporary coverings; OR</p> <p>(5d) Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.</p>
All Categories	(6a) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3
CONTINGENCY CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY	CONTROL MEASURES
Earth-moving	(1A) Cease all active operations; OR (2A) Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B) On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR (1B) Apply chemical stabilizers prior to wind event; OR (2B) Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR (3B) Take the actions specified in Table 2, Item (3c); OR (4B) Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C) Apply chemical stabilizers prior to wind event; OR (2C) Apply water twice per hour during active operation; OR (3C) Stop all vehicular traffic.
Open storage piles	(1D) Apply water twice per hour; OR (2D) Install temporary coverings.
Paved road track-out	(1E) Cover all haul vehicles; OR (2E) Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

Table 4
(Conservation Management Practices for Confined Animal Facilities)

SOURCE CATEGORY	CONSERVATION MANAGEMENT PRACTICES
Manure Handling (Only applicable to Commercial Poultry Ranches)	<ul style="list-style-type: none"> (1a) Cover manure prior to removing material off-site; AND (1b) Spread the manure before 11:00 AM and when wind conditions are less than 25 miles per hour; AND (1c) Utilize coning and drying manure management by removing manure at laying hen houses at least twice per year and maintain a base of no less than 6 inches of dry manure after clean out; or in lieu of complying with conservation management practice (1c), comply with conservation management practice (1d). (1d) Utilize frequent manure removal by removing the manure from laying hen houses at least every seven days and immediately thin bed dry the material.
Feedstock Handling	<ul style="list-style-type: none"> (2a) Utilize a sock or boot on the feed truck auger when filling feed storage bins.
Disturbed Surfaces	<ul style="list-style-type: none"> (3a) Maintain at least 70 percent vegetative cover on vacant portions of the facility; OR (3b) Utilize conservation tillage practices to manage the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops (if applicable) in narrow slots or tilled strips; OR (3c) Apply dust suppressants in sufficient concentrations and frequencies to maintain a stabilized surface.
Unpaved Roads	<ul style="list-style-type: none"> (4a) Restrict access to private unpaved roads either through signage or physical access restrictions and control vehicular speeds to no more than 15 miles per hour through worker notifications, signage, or any other necessary means; OR (4b) Cover frequently traveled unpaved roads with low silt content material (i.e., asphalt, concrete, recycled road base, or gravel to a minimum depth of four inches); OR (4c) Treat unpaved roads with water, mulch, chemical dust suppressants or other cover to maintain a stabilized surface.
Equipment Parking Areas	<ul style="list-style-type: none"> (5a) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR (5b) Apply material with low silt content (i.e., asphalt, concrete, recycled road base, or gravel to a depth of four inches).

Appendix H

Traffic Data

Table ____: Existing Condition (Year 2009) Arterial Interchange Analysis and Levels of Service

ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	v/c	Average Delay (sec)	LOS	Capacity	Volume	v/c	Average Delay (sec)	LOS
Bristol Street Interchange															
1	Anton/South Coast Plaza	Bristol St	Existing Traffic Signal	Costa Mesa	--	--	--	0.70	12.9	B	--	--	0.72	30.7	C
2	I-405 NB Off-Ramp/South Coast Plaza	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.45	16.4	B	--	--	0.73	30.4	C
3	I-405 NB On-Ramp (for NB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	142	0.09	--	--	1500	314	0.21	--	--
4	I-405 NB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized On-Ramp	Caltrans, Costa Mesa	1	1500	303	0.20	--	--	1500	222	0.15	--	--
5	I-405 SB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1.5	3000	975	0.33	--	--	3000	1328	0.44	--	--
6	I-405 SB Off-Ramp & On-Ramp (for NB Bristol St)	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.61	15.8	B	--	--	0.80	14.8	B
Fairview Road Interchange															
1	I-405 NB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.93	28.4	C	--	--	0.85	33.7	C
2	I-405 SB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.79	16.0	B	--	--	0.66	21.3	C
3	South Coast Drive	I-405 NB Off-Ramp	Existing Traffic Signal		--	--	--	0.19	21.0	C	--	--	0.35	24.9	C
Harbor Boulevard & Hyland Avenue Interchange															
1	I-405 NB On-Ramp/South Coast Dr	Hyland Ave	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.26	8.7	A	--	--	0.58	8.0	A
2	I-405 SB On-Ramp (for SB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	906	0.60	--	--	1500	973	0.65	--	--
3	I-405 NB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.55	19.7	B	--	--	0.75	26.2	C
4	I-405 NB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	470	0.31	--	--	1500	565	0.38	--	--
5	I-405 SB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.58	18.3	B	--	--	0.71	16.2	B
6	I-405 SB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized On-Ramp	Caltrans, Costa Mesa	1.5	3000	1254	0.42	--	--	3000	699	0.23	--	--
7	Gisler Ave	Harbor Blvd	Existing Traffic Signal	Costa Mesa	--	--	--	0.71	26.8	C	--	--	0.89	30.7	C
8	Ikea Way	Susan St	Existing Traffic Signal	Costa Mesa	--	--	--	0.26	2.9	A	--	--	0.33	8.0	A
Euclid Street & Ellis Avenue Interchange															
1	I-405 NB Ramps/Newhope St	Euclid St	Existing Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.50	31.8	C	--	--	0.68	37.9	D
2	Ellis Ave	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.94	43.6	D	--	--	0.98	48.2	D
Brookhurst Street & Talbert Avenue Interchange															
1	Slater Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	--	--	--	0.93	46.5	D	--	--	0.81	38.3	D
2	I-405 NB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	194	0.06	--	--	3000	248	0.08	--	--
3	I-405 NB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	476	0.32	--	--	1500	609	0.41	--	--
4	I-405 NB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	533	0.36	--	--	1500	430	0.29	--	--
5	I-405 NB On-Ramp (for NB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	631	0.42	--	--	1500	643	0.43	--	--
6	I-405 SB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	1241	0.83	--	--	1500	677	0.45	--	--
7	I-405 SB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	90	0.06	--	--	1500	193	0.13	--	--
8	I-405 SB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Unsignalized Off-Ramp	Caltrans, Fountain Valley	1	1500	678	0.45	--	--	1500	673	0.45	--	--
9	Talbert Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	--	--	--	0.95	47.3	D	--	--	0.90	47.8	D
10	Talbert Ave	I-405 SB On-Ramp (for EB Talbert Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1	1500	1037	0.69	--	--	1500	696	0.46	--	--
Magnolia Street & Warner Avenue Interchange															
1	Heil Ave	Magnolia St	Existing Traffic Signal	Westminster	--	--	--	0.74	27.0	C	--	--	0.50	16.2	B
2	I-405 NB On-Ramp (for SB Magnolia Ave)	Magnolia St	Unsignalized On-Ramp	Caltrans, Westminster	1.5	3000	218	0.07	--	--	3000	135	0.05	--	--
3	I-405 NB Off-Ramp (to NB Magnolia Ave)	Magnolia St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	201	0.13	--	--	1500	510	0.34	--	--
4	I-405 NB On-Ramp (for NB Magnolia Ave)	Magnolia St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	562	0.37	--	--	1500	392	0.26	--	--
5	I-405 SB On-Ramp (for SB Magnolia Ave)	Magnolia St	Unsignalized Loop On-Ramp	Caltrans, Huntington Beach	1	1500	992	0.66	--	--	1500	340	0.23	--	--
6	I-405 SB Off-Ramp (to NB & SB Magnolia Ave)	Magnolia St	Existing Traffic Signal	Caltrans, Huntington Beach, Fountain Valley	--	--	--	0.62	8.0	A	--	--	0.77	13.5	B
7	Warner Ave	Magnolia St	Existing Traffic Signal	Fountain Valley, Huntington Beach	--	--	--	0.91	44.3	D	--	--	0.94	46.1	D
8	Warner Ave	I-405 SB On-Ramp (for EB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	1342	0.45	--	--	3000	685	0.23	--	--
9	Warner Ave	I-405 SB Off-Ramp (to EB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	259	0.17	--	--	1500	537	0.36	--	--
10	Warner Ave	I-405 NB Off-Ramp (to WB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	481	0.32	--	--	1500	630	0.42	--	--
11	Warner Ave	I-405 NB On-Ramp (for WB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	500	0.17	--	--	3000	807	0.27	--	--
Beach Boulevard & Edinger Avenue Interchange															
1	McFadden Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.94	46.3	D	--	--	0.97	60.9	E
2	I-405 NB On-Ramp (for SB Beach Blvd)	Beach Blvd	Unsignalized On-Ramp	Caltrans, Westminster	1	1500	271	0.18	--	--	1500	256	0.17	--	--
3	I-405 NB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Off-Ramp	Caltrans, Westminster	1	1500	836	0.56	--	--	1500	893	0.60	--	--
4	I-405 NB Off-Ramp (to SB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	683	0.46	--	--	1500	711	0.47	--	--
5	I-405 NB On-Ramp (for NB Beach Blvd)	Beach Blvd	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	769	0.51	--	--	1500	910	0.61	--	--
6	Center Ave	Beach Blvd	Existing Traffic Signal	Caltrans											

Table ____: Existing Condition (Year 2009) Arterial Interchange Analysis and Levels of Service

ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	v/c	Average Delay (sec)	LOS	Capacity	Volume	v/c	Average Delay (sec)	LOS
7	Center Ave (Huntington Beach Mall)	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Huntington Beach	--	--	--	0.43	15.3	B	--	--	0.77	22.9	C
8	I-405 SB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	43	0.03	--	--	1500	150	0.10	--	--
9	Edinger Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach, Westminster	--	--	--	0.94	55.1	E	--	--	0.99	59.1	E
10	Edinger Ave	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Huntington Beach	1	1500	902	0.60	--	--	1500	744	0.50	--	--
Goldenwest Street & Bolsa Avenue Interchange															
1	I-405 NB On-Ramp (for NB Goldenwest St)	Goldenwest St	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	752	0.50	--	--	1500	788	0.53	--	--
2	Westminster Mall	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.31	6.5	A	--	--	0.37	8.9	A
3	Westminster Mall	Goldenwest St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.65	9.3	A	--	--	0.61	10.5	B
4	Bolsa Ave	Goldenwest St	Existing Traffic Signal	Huntington Beach, Westminster	--	--	--	0.68	36.0	D	--	--	0.95	49.4	D
5	Bolsa Ave	I-405 SB On-Ramp (for EB Bolsa Ave)	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	323	0.22	--	--	1500	737	0.49	--	--
6	Bolsa Ave	I-405 SB Off-Ramp (to EB Bolsa Ave)	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.35	10.7	B	--	--	0.15	10.3	B
7	Bolsa Ave	I-405 NB Off-Ramp (to WB Bolsa Ave)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	799	0.53	--	--	1500	702	0.47	--	--
Springdale Street & Westminster Boulevard Interchange															
1	I-405 SB Off-Ramp	Springdale St	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.47	28.1	D	--	--	0.60	36.1	E
2	Westminster Blvd	Springdale St	Existing Traffic Signal	Westminster	--	--	--	0.76	39.9	D	--	--	0.79	40.1	D
3	Westminster Blvd	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	2	3000	708	0.24	--	--	3000	897	0.30	--	--
4	Westminster Blvd	I-405 SB Off-Ramp (to EB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	238	0.16	--	--	1500	219	0.15	--	--
5	Westminster Blvd	I-405 NB Off-Ramp (to WB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	599	0.40	--	--	1500	567	0.38	--	--
6	Westminster Blvd	I-405 NB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	2	3000	910	0.30	--	--	3000	836	0.28	--	--
7	Westminster Blvd	I-405 NB Off-Ramp/Willow Ln	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.50	14.1	B	--	--	0.53	12.6	B
Bolsa Chica Road-Valley View Street & Garden Grove Boulevard Interchange															
1	Garden Grove Blvd	I-405 NB Off-Ramp/SR-22 EB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.84	47.3	D	--	--	0.93	54.7	D
2	Garden Grove Blvd	Bolsa Chica Rd/Valley View St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.92	23.7	C	--	--	1.06	40.7	F*
3	I-405 SB On-Ramp (for SB Bolsa Chica Rd)	Bolsa Chica Rd	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	740	0.49	--	--	1500	920	0.61	--	--
4	I-405 SB Off-Ramp (to SB Bolsa Chica Rd)	Bolsa Chica Rd	Unsignalized Off-Ramp	Caltrans, Westminster	1	1500	821	0.55	--	--	1500	680	0.45	--	--
5	SR-22 WB/I-405 NB On-Ramp (for SB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	328	0.22	--	--	1500	369	0.25	--	--
6	SR-22 WB/I-405 NB On-Ramp (for NB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	603	0.40	--	--	1500	707	0.47	--	--
Seal Beach Boulevard Interchange															
1	I-405 NB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.81	30.2	C	--	--	0.85	32.1	C
2	I-405 SB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.95	46.0	D	--	--	1.01	51.3	F*
Bear Street Interchange at SR-73															
1	SR-73 NB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.50	13.6	B	--	--	0.47	12.8	B
2	SR-73 SB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.43	13.1	B	--	--	0.51	13.5	B
Katella Avenue/Willow Street Interchange at I-605															
1	Katella Ave	I-605 NB On-Ramp (for WB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1.5	3000	982	0.33	--	--	3000	1120	0.37	--	--
2	Katella Ave	I-605 NB On-Ramp (for EB Katella Ave)	Existing Traffic Signal	Caltrans, Los Alamitos, Orange County	--	--	--	0.64	1.7	A	--	--	0.65	3.7	A
3	Katella Ave	I-605 NB Off-Ramp (to EB Katella Ave)	Unsignalized Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1136	0.76	--	--	1500	736	0.49	--	--
4	Katella Ave	I-605 NB Off-Ramp (to WB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	49	0.03	--	--	1500	77	0.05	--	--
5	Katella Ave	I-605 SB On-Ramp (for WB Katella Ave)	Unsignalized Loop On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	536	0.36	--	--	1500	656	0.44	--	--
6	Katella Ave	I-605 SB Off-Ramp (to EB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1204	0.80	--	--	1500	1073	0.72	--	--
7	Katella Ave	I-605 SB On-Ramp (for EB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	63	0.04	--	--	1500	44	0.03	--	--
8	Willow St	I-605 SB Off-Ramp (to WB Willow St)	Unsignalized Off-Ramp	Caltrans, Long Beach	1	1500	547	0.36	--	--	1500	534	0.36	--	--

Notes: 1. Level of Service (LOS) analysis were conducted using Synchro 6.0 per 2000 Highway Capacity Manual. Analysis worksheets are included in Appendix.
 2. Ramp capacity assumptions for On-Ramp & Off-Ramp (with separate lanes on surface street): single lane = 1500 vph; single lane plus a shared lane or dual lanes = 3000 vph.
 3. F*: Due to excessive volume-to-capacity ratio (over 1.0), the intersection is expected to operate at LOS F.

Appendix ____: No Built Condition (Year 2020) Arterial Interchange Analysis and Levels of Service

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ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	v/c	Average Delay (sec)	LOS	Capacity	Volume	v/c	Average Delay (sec)	LOS
Bristol Street Interchange															
1	I-405 NB Off-Ramp/South Coast Plaza	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.59	19.7	B	--	--	0.86	37.1	D
2	I-405 NB On-Ramp (for NB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	148	0.10	--	--	1500	335	0.22	--	--
3	I-405 NB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized On-Ramp	Caltrans, Costa Mesa	1	1500	349	0.23	--	--	1500	238	0.16	--	--
4	I-405 SB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1.5	3000	891	0.30	--	--	3000	1213	0.40	--	--
5	I-405 SB Off-Ramp & On-Ramp (for NB Bristol St)	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.63	16.6	B	--	--	0.95	19.2	B
Fairview Road Interchange															
1	I-405 NB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	1.06	44.0	F*	--	--	0.93	36.3	D
2	I-405 SB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.91	20.5	C	--	--	0.70	27.1	C
3	South Coast Drive	I-405 NB Off-Ramp	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.23	21.6	C			0.39	26.3	C
Harbor Boulevard & Hyland Avenue Interchange															
1	I-405 NB On-Ramp/South Coast Dr	Hyland Ave	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.42	7.8	A	--	--	0.64	9.4	A
2	I-405 SB On-Ramp (for SB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	938	0.63	--	--	1500	1039	0.69	--	--
3	I-405 NB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.61	20.3	C	--	--	0.78	28.9	C
4	I-405 NB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	502	0.33	--	--	1500	603	0.40	--	--
5	I-405 SB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.63	18.6	B	--	--	0.77	16.2	B
6	I-405 SB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized On-Ramp	Caltrans, Costa Mesa	1.5	3000	1339	0.45	--	--	3000	747	0.25	--	--
7	Gisler Ave	Harbor Blvd	Existing Traffic Signal	Costa Mesa	--	--	--	0.77	30.4	C	--	--	0.95	43.3	D
8	Ikea Way	Susan St	Existing Traffic Signal	Costa Mesa	--	--	--	0.31	6.2	A	--	--	0.36	8.5	A
Euclid Street & Ellis Avenue Interchange															
1	I-405 NB Ramps/Newhope St	Euclid St	Existing Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.56	31.3	C	--	--	0.82	44.6	D
2	Ellis Ave	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Fountain Valley	--	--	--	1.14	83.9	F	--	--	1.30	141.7	F
Brookhurst Street & Talbert Avenue Interchange															
1	Slater Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	--	--	--	1.17	78.8	F*	--	--	0.91	47.0	D
2	I-405 NB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	339	0.11	--	--	3000	357	0.12	--	--
3	I-405 NB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	580	0.39	--	--	1500	936	0.62	--	--
4	I-405 NB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	624	0.42	--	--	1500	459	0.31	--	--
5	I-405 NB On-Ramp (for NB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	775	0.52	--	--	1500	861	0.57	--	--
6	I-405 SB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	1325	0.88	--	--	1500	723	0.48	--	--
7	I-405 SB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	96	0.06	--	--	1500	206	0.14	--	--
8	I-405 SB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Unsignalized Off-Ramp	Caltrans, Fountain Valley	1	1500	724	0.48	--	--	1500	744	0.50	--	--
9	Talbert Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	--	--	--	1.42	128.7	F	--	--	0.99	58.2	E
10	Talbert Ave	I-405 SB On-Ramp (for EB Talbert Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1	1500	1107	0.74	--	--	1500	744	0.50	--	--
Magnolia Street & Warner Avenue Interchange															
1	Heil Ave	Magnolia St	Existing Traffic Signal	Westminster	--	--	--	0.80	29.3	C	--	--	0.63	18.5	B
2	I-405 NB On-Ramp (for SB Magnolia Ave)	Magnolia St	Unsignalized On-Ramp	Caltrans, Westminster	1.5	3000	258	0.09	--	--	3000	144	0.05	--	--
3	I-405 NB Off-Ramp (to NB Magnolia Ave)	Magnolia St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	236	0.16	--	--	1500	673	0.45	--	--
4	I-405 NB On-Ramp (for NB Magnolia Ave)	Magnolia St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	602	0.40	--	--	1500	424	0.28	--	--
5	I-405 SB On-Ramp (for SB Magnolia Ave)	Magnolia St	Unsignalized Loop On-Ramp	Caltrans, Huntington Beach	1	1500	1059	0.71	--	--	1500	363	0.24	--	--
6	I-405 SB Off-Ramp (to NB & SB Magnolia Ave)	Magnolia St	Existing Traffic Signal	Caltrans, Huntington Beach, Fountain Valley	--	--	--	0.67	9.5	A	--	--	0.83	16.7	B
7	Warner Ave	Magnolia St	Existing Traffic Signal	Fountain Valley, Huntington Beach	--	--	--	0.98	54.8	D	--	--	1.01	53.8	F*
8	Warner Ave	I-405 SB On-Ramp (for EB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	1391	0.46	--	--	3000	732	0.24	--	--
9	Warner Ave	I-405 SB Off-Ramp (to EB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	522	0.35	--	--	1500	574	0.38	--	--
10	Warner Ave	I-405 NB Off-Ramp (to WB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	505	0.34	--	--	1500	781	0.52	--	--
11	Warner Ave	I-405 NB On-Ramp (for WB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	534	0.18	--	--	3000	856	0.29	--	--

Appendix ____: No Built Condition (Year 2020) Arterial Interchange Analysis and Levels of Service

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ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	v/c	Average Delay (sec)	LOS	Capacity	Volume	v/c	Average Delay (sec)	LOS
Beach Boulevard & Edinger Avenue Interchange															
1	McFadden Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Westminster	--	--	--	1.03	72.5	F*	--	--	1.05	74.7	F*
2	I-405 NB On-Ramp (for SB Beach Blvd)	Beach Blvd	Unsignalized On-Ramp	Caltrans, Westminster	1	1500	289	0.19	--	--	1500	277	0.18	--	--
3	I-405 NB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Off-Ramp	Caltrans, Westminster	1	1500	866	0.58	--	--	1500	958	0.64	--	--
4	I-405 NB Off-Ramp (to SB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	729	0.49	--	--	1500	935	0.62	--	--
5	I-405 NB On-Ramp (for NB Beach Blvd)	Beach Blvd	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	828	0.55	--	--	1500	1002	0.67	--	--
6	Center Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach	--	--	--	0.82	11.5	B	--	--	0.93	27.2	C
7	Center Ave (Huntington Beach Mall)	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Huntington Beach	--	--	--	0.58	16.9	B	--	--	0.86	28.1	C
8	I-405 SB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	45	0.03	--	--	1500	160	0.11	--	--
9	Edinger Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach, Westminster	--	--	--	1.06	60.6	F*	--	--	1.05	66.6	F
10	Edinger Ave	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Huntington Beach	1	1500	998	0.67	--	--	1500	780	0.52	--	--
Goldenwest Street & Bolsa Avenue Interchange															
1	I-405 NB On-Ramp (for NB Goldenwest St)	Goldenwest St	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	826	0.55	--	--	1500	885	0.59	--	--
2	Westminster Mall	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.36	6.9	A	--	--	0.40	9.9	A
3	Westminster Mall	Goldenwest St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.71	10.5	B	--	--	0.69	12.3	B
4	Bolsa Ave	Goldenwest St	Existing Traffic Signal	Huntington Beach, Westminster	--	--	--	0.76	36.8	D	--	--	1.04	64.0	F*
5	Bolsa Ave	I-405 SB On-Ramp (for EB Bolsa Ave)	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	340	0.23	--	--	1500	760	0.51	--	--
6	Bolsa Ave	I-405 SB Off-Ramp (to EB Bolsa Ave)	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.38	11.0	B	--	--	0.17	10.6	B
7	Bolsa Ave	I-405 NB Off-Ramp (to WB Bolsa Ave)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	866	0.58	--	--	1500	769	0.51	--	--
Springdale Street & Westminster Boulevard Interchange															
1	I-405 SB Off-Ramp	Springdale St	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.67	47.9	E	--	--	0.69	45.9	E
2	Westminster Blvd	Springdale St	Existing Traffic Signal	Westminster	--	--	--	0.83	42.0	D	--	--	0.94	57.1	E
3	Westminster Blvd	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	2	3000	768	0.26	--	--	3000	969	0.32	--	--
4	Westminster Blvd	I-405 SB Off-Ramp (to EB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	269	0.18	--	--	1500	235	0.16	--	--
5	Westminster Blvd	I-405 NB Off-Ramp (to WB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	639	0.43	--	--	1500	652	0.43	--	--
6	Westminster Blvd	I-405 NB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	2	3000	971	0.32	--	--	3000	909	0.30	--	--
7	Westminster Blvd	I-405 NB Off-Ramp/Willow Ln	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.58	14.6	B	--	--	0.65	14.1	B
Bolsa Chica Road-Valley View Street & Garden Grove Boulevard Interchange															
1	Garden Grove Blvd	I-405 NB Off-Ramp/SR-22 EB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.89	55.8	E	--	--	0.99	67.6	E
2	Garden Grove Blvd	Bolsa Chica Rd/Valley View St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.91	23.3	C	--	--	1.00	39.1	F*
3	I-405 SB On-Ramp (for SB Bolsa Chica Rd)	Bolsa Chica Rd	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	944	0.63	--	--	1500	1145	0.76	--	--
4	I-405 SB Off-Ramp (to SB Bolsa Chica Rd)	Bolsa Chica Rd	Unsignalized Off-Ramp	Caltrans, Westminster	1	1500	1171	0.78	--	--	1500	979	0.65	--	--
5	SR-22 WB/I-405 NB On-Ramp (for SB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	340	0.23	--	--	1500	435	0.29	--	--
6	SR-22 WB/I-405 NB On-Ramp (for NB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	704	0.47	--	--	1500	857	0.57	--	--
Seal Beach Boulevard Interchange															
1	I-405 NB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.78	27.4	C	--	--	0.87	33.7	C
2	I-405 SB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	1.12	69.1	F*	--	--	1.19	76.4	F*
Bear Street Interchange at SR-73															
1	SR-73 NB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.55	14.1	B	--	--	0.53	13.3	B
2	SR-73 Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.48	13.3	B	--	--	0.55	14.3	B
Katella Avenue/Willow Street Interchange at I-605															
1	Katella Ave	I-605 NB On-Ramp (for WB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1.5	3000	1049	0.35	--	--	3000	1196	0.40	--	--
2	Katella Ave	I-605 NB On-Ramp (for EB Katella Ave)	Existing Traffic Signal	Caltrans, Los Alamitos, Orange County	--	--	--	0.69	2.5	A	--	--	0.73	4.9	A
3	Katella Ave	I-605 NB Off-Ramp (to EB Katella Ave)	Unsignalized Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1214	0.81	--	--	1500	786	0.52	--	--
4	Katella Ave	I-605 NB Off-Ramp (to WB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	70	0.05	--	--	1500	100	0.07	--	--
5	Katella Ave	I-605 SB On-Ramp (for WB Katella Ave)	Unsignalized Loop On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	575	0.38	--	--	1500	701	0.47	--	--
6	Katella Ave	I-605 SB Off-Ramp (to EB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1285	0.86	--	--	1500	1146	0.76	--	--
7	Katella Ave	I-605 SB On-Ramp (for EB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	166	0.11	--	--	1500	122	0.08	--	--
8	Willow St	I-605 SB Off-Ramp (to WB Willow St)	Unsignalized Off-Ramp	Caltrans, Long Beach	1	1500	584	0.39	--	--	1500	630	0.42	--	--

Notes: 1. Level of Service (LOS) analysis were conducted using Synchro 6.0 per 2000 Highway Capacity Manual. Analysis worksheets are included in Appendix.
2. Ramp capacity assumptions for On-Ramp & Off-Ramp (with separate lanes on surface street): single lane = 1500 vph; single lane plus a shared lane or dual lanes = 3000 vph.
3. F*: Due to excessive volume-to-capacity ratio (over 1.0), the intersection is expected to operate at LOS F.

Appendix ____: Project Condition with Improvements (Year 2020) Arterial Interchange Analysis and Levels of Service

Page 1 of 2

ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	v/c	Average Delay (sec)	LOS	Capacity	Volume	v/c	Average Delay (sec)	LOS
Bristol Street Interchange															
1	I-405 NB Off-Ramp/South Coast Plaza	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.59	18.8	B	--	--	0.90	38.7	D
2	I-405 NB On-Ramp (for NB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	148	0.10	--	--	1500	335	0.22	--	--
3	I-405 NB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized On-Ramp	Caltrans, Costa Mesa	1	1500	349	0.23	--	--	1500	238	0.16	--	--
4	I-405 SB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1.5	3000	891	0.30	--	--	3000	1213	0.40	--	--
5	I-405 SB Off-Ramp & On-Ramp (for NB Bristol St)	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.63	15.5	B	--	--	0.96	19.3	B
Fairview Road Interchange															
1	I-405 NB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	1.07	44.5	F*	--	--	0.93	33.9	C
2	I-405 SB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.92	20.1	C	--	--	0.70	25.8	C
Harbor Boulevard & Hyland Avenue Interchange															
1	I-405 NB On-Ramp/South Coast Dr	Hyland Ave	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.42	7.8	A	--	--	0.64	9.2	A
2	I-405 SB On-Ramp (for SB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	968	0.65	--	--	1500	1039	0.69	--	--
3	I-405 NB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.61	19.5	B	--	--	0.78	26.3	C
4	I-405 NB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	502	0.33	--	--	1500	603	0.40	--	--
5	I-405 SB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.63	18.4	B	--	--	0.77	16.7	B
6	I-405 SB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized On-Ramp	Caltrans, Costa Mesa	1.5	3000	1339	0.45	--	--	3000	747	0.25	--	--
7	Gisler Ave	Harbor Blvd	Existing Traffic Signal	Costa Mesa	--	--	--	0.80	30.6	C	--	--	0.92	32.7	C
8	Ikea Way	Susan St	Existing Traffic Signal	Costa Mesa	--	--	--	0.32	6.4	A	--	--	0.36	8.4	A
Euclid Street & Ellis Avenue Interchange															
1	I-405 NB Ramps/Newhope St	Euclid St	Existing Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.58	34.2	C	--	--	0.78	47.7	D
2	Ellis Ave (WBR to SB On-Ramp)	I-405 SB Ramps (I-405 SB On-Ramp is for WB Ellis Ave)	Existing Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.66	18.7	B	--	--	0.76	19.9	B
3	Ellis Ave (EBT to SB On-Ramp)	I-405 SB On-Ramp (for EB Ellis Ave)	Proposed On-Ramp	Caltrans, Fountain Valley	2	3000	1126	0.38	--	--	3000	770	0.26	--	--
Brookhurst Street & Talbert Avenue Interchange															
1	Slater Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	--	--	--	1.00	53.3	F*	--	--	0.90	44.7	D
2	I-405 NB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	339	0.11	--	--	3000	357	0.12	--	--
3 & 4	I-405 NB Off-Ramp (to NB & SB Brookhurst St)	Brookhurst St	Proposed Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.62	13.3	B	--	--	0.68	17.5	B
4	I-405 NB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Part of Proposed Traffic Signal	Caltrans, Fountain Valley	--	--	--	--	--	--	--	--	--	--	--
5	I-405 NB On-Ramp (for NB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1.5	3000	775	0.26	--	--	3000	861	0.29	--	--
6	I-405 SB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1.5	3000	1325	0.44	--	--	3000	723	0.24	--	--
7 & 8	I-405 SB Off-Ramp (to NB & SB Brookhurst St)	Brookhurst St	Proposed Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.57	11.5	B	--	--	0.57	13.6	B
8	I-405 SB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Part of Proposed Traffic Signal	Caltrans, Fountain Valley	--	--	--	--	--	--	--	--	--	--	--
9	Talbert Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	--	--	--	1.06	71.0	F*	--	--	0.95	46.2	D
10	Talbert Ave	I-405 SB On-Ramp (for EB Talbert Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	1107	0.37	--	--	3000	744	0.25	--	--
Magnolia Street & Warner Avenue Interchange															
1	Heil Ave	Magnolia St	Existing Traffic Signal	Westminster	--	--	--	0.84	25.2	C	--	--	0.63	19.7	B
2	I-405 NB On-Ramp (for SB Magnolia St)	Magnolia St	Unsignalized On-Ramp	Caltrans, Westminster	1	1500	258	0.17	--	--	1500	144	0.10	--	--
3	I-405 NB Off-Ramp (to NB Magnolia St)	Magnolia St	Proposed Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.47	1.5	A	--	--	0.71	6.8	A
4	I-405 NB On-Ramp (for NB Magnolia St)	Magnolia St	Part of Proposed Traffic Signal	Caltrans, Fountain Valley	--	--	--	--	--	--	--	--	--	--	--
5	I-405 SB On-Ramp (for SB Magnolia St)	Magnolia St	Part of Proposed Traffic Signal	Caltrans, Huntington Beach	--	--	--	--	--	--	--	--	--	--	--
6	I-405 SB Off-Ramp (to NB & SB Magnolia St)	Magnolia St	Existing Traffic Signal	Caltrans, Huntington Beach, Fountain Valley	--	--	--	0.76	9.4	A	--	--	0.70	11.5	B
7	Warner Ave	Magnolia St	Existing Traffic Signal	Fountain Valley, Huntington Beach	--	--	--	0.86	45.8	D	--	--	0.89	44.4	D
8	Warner Ave	I-405 SB On-Ramp (for EB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	1391	0.46	--	--	3000	732	0.24	--	--
9	Warner Ave	I-405 SB Off-Ramp (to EB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	522	0.35	--	--	1500	574	0.38	--	--
10	Warner Ave	I-405 NB Off-Ramp (to WB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	505	0.34	--	--	1500	781	0.52	--	--
11	Warner Ave	I-405 NB On-Ramp (for WB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	534	0.18	--	--	3000	856	0.29	--	--
Beach Boulevard & Edinger Avenue Interchange															
1	McFadden Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Westminster	--	--	--	1.02	62.2	F*	--	--	1.01	64.7	F*
2	I-405 NB On-Ramp (for SB Beach Blvd)	Beach Blvd	Unsignalized On-Ramp	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	--
3	I-405 NB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Proposed Traffic Signal (to NB Beach Blvd)	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	--
4	I-405 NB Off-Ramp (to SB Beach Blvd)	Beach Blvd	Part of the Proposed Traffic Signal (for SB Beach Blvd)	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	--
5	I-405 NB On-Ramp (for NB Beach Blvd)	Beach Blvd	Unsignalized Loop On-Ramp	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	--
1-4	I-405 NB Ramps (for NB and SB Beach Blvd)	Beach Blvd	Proposed Traffic Signal	Caltrans, Westminster	--	--	--	0.71	14.8	B	--	--	0.80	16.4	B
5	Center Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach	--	--	--	0.82	12.9	B	--	--	0.87	18.0	B
6	Center Ave (Huntington Beach Mall)	I-405 SB Ramps	Existing Traffic Signal												

Appendix ____: Project Condition with Improvements (Year 2020) Arterial Interchange Analysis and Levels of Service

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ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	v/c	Average Delay (sec)	LOS	Capacity	Volume	v/c	Average Delay (sec)	LOS
Goldenwest Street & Bolsa Avenue Interchange															
1	I-405 NB On-Ramp (for NB Goldenwest St)	Goldenwest St	Unsignalized Loop On-Ramp	Caltrans, Westminster	1.5	3000	826	0.28	--	--	3000	885	0.30	--	--
2	Westminster Mall	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.30	10.9	B	--	--	0.40	11.5	B
3	Westminster Mall	Goldenwest St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.59	9.6	A	--	--	0.58	7.4	A
4	Bolsa Ave	Goldenwest St	Existing Traffic Signal	Huntington Beach, Westminster	--	--	--	0.73	36.1	D	--	--	0.85	49.8	D
5	Bolsa Ave	I-405 SB On-Ramp (for EB Bolsa Ave)	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	340	0.23	--	--	1500	760	0.51	--	--
6	Bolsa Ave	I-405 SB Off-Ramp (to EB Bolsa Ave)	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.35	10.4	B	--	--	0.15	10.1	B
7	Bolsa Ave	I-405 NB Off-Ramp (to WB Bolsa Ave)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	866	0.58	--	--	1500	769	0.51	--	--
Option B															
2	Westminster Mall	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	--
Springdale Street & Westminster Boulevard Interchange															
1	I-405 SB Off-Ramp	Springdale St	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.37	7.6	A	--	--	0.54	7.2	A
2	Westminster Blvd	Springdale St	Existing Traffic Signal	Westminster	--	--	--	0.86	48.8	D	--	--	0.89	50.5	D
3	Westminster Blvd	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	1.5	3000	768	0.26	--	--	3000	968	0.32	--	--
4	Westminster Blvd	I-405 SB Off-Ramp (to EB Westminster Blvd)	Proposed Stop-Controlled Off-Ramp	Caltrans, Westminster	1	1500	269	0.18	--	--	1500	235	0.16	--	--
Option A															
5 & 6	Westminster Blvd	I-405 NB Ramps (to WB & EB Westminster Blvd)	Proposed Traffic Signal	Caltrans, Westminster	--	--	--	0.55	15.6	B	--	--	0.66	16.2	B
7	Westminster Blvd	Willow Ln	Existing Traffic Signal (Removed I-405 NB Off-Ramp)	Westminster	--	--	--	0.60	24.5	C	--	--	0.65	23.6	C
Option B															
5	Westminster Blvd	I-405 NB Off-Ramp (to WB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500					1500				
6	Westminster Blvd	I-405 NB On-Ramp	Proposed Traffic Signal	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	--
7	Westminster Blvd	I-405 NB Off-Ramp/Willow Ln	Existing Traffic Signal	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	--
Bolsa Chica Road-Valley View Street & Garden Grove Boulevard Interchange															
1	Garden Grove Blvd	I-405 NB Off-Ramp/SR-22 EB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.87	46.5	D	--	--	0.90	45.7	D
2	Garden Grove Blvd	Bolsa Chica Rd/Valley View St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.90	20.6	C	--	--	0.92	26.1	C
3 & 4	I-405 SB Ramps (to NB & SB Bolsa Chica Rd)	Bolsa Chica Rd	Proposed Traffic Signal	Caltrans, Westminster	--	--	--	0.72	13.1	B	--	--	0.76	9.9	A
4	<i>I-405 SB Off-Ramp (to SB Bolsa Chica Rd)</i>	<i>Bolsa Chica Rd</i>	<i>Part of the Proposed Traffic Signal</i>	<i>Caltrans, Westminster</i>	--	--	--	--	--	--	--	--	--	--	--
5	SR-22 WB/I-405 NB On-Ramp (for SB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	340	0.23	--	--	1500	435	0.29	--	--
6	SR-22 WB/I-405 NB On-Ramp (for NB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	704	0.47	--	--	1500	857	0.57	--	--
Seal Beach Boulevard Interchange															
1	I-405 NB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.76	24.7	C	--	--	0.71	24.7	C
2	I-405 SB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.79	35.0	D	--	--	0.96	51.3	D
Bear Street Interchange at SR-73															
1	SR-73 NB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.55	16.1	B	--	--	0.52	15.0	B
2	SR-73 SB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.49	14.4	B	--	--	0.58	16.1	B
Katella Avenue/Willow Street Interchange at I-605															
1	Katella Ave	I-605 NB On-Ramp (for WB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1.5	3000	1049	0.35	--	--	3000	1196	0.40	--	--
2	Katella Ave	I-605 NB On-Ramp (for EB Katella Ave)	Existing Traffic Signal	Caltrans, Los Alamitos, Orange County	--	--	--	0.69	2.5	A	--	--	0.73	4.9	A
3	Katella Ave	I-605 NB Off-Ramp (to EB Katella Ave)	Unsignalized Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1214	0.81	--	--	1500	786	0.52	--	--
4	Katella Ave	I-605 NB Off-Ramp (to WB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	70	0.05	--	--	1500	100	0.07	--	--
5	Katella Ave	I-605 SB On-Ramp (for WB Katella Ave)	Unsignalized Loop On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	575	0.38	--	--	1500	701	0.47	--	--
6	Katella Ave	I-605 SB Off-Ramp (to EB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1285	0.86	--	--	1500	1146	0.76	--	--
7	Katella Ave	I-605 SB On-Ramp (for EB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	166	0.11	--	--	1500	122	0.08	--	--
8	Willow St	I-605 SB Off-Ramp (to WB Willow St)	Unsignalized Off-Ramp	Caltrans, Long Beach	1	1500	584	0.39	--	--	1500	630	0.42	--	--

Notes: 1. Level of Service (LOS) analysis were conducted using Synchro 6.0 per 2000 Highway Capacity Manual. Analysis worksheets are included in Appendix.
 2. Ramp capacity assumptions for On-Ramp & Off-Ramp (with separate lanes on surface street): single lane = 1500 vph; single lane plus a shared lane or dual lanes = 3000 vph.
 3. F*: Due to excessive volume-to-capacity ratio (over 1.0), the intersection is expected to operate at LOS F.

Appendix ____ : No Built Condition (Year 2040) Arterial Interchange Analysis and Levels of Service

ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	Volume/ Capacity	Average Delay (sec)	LOS	Capacity	Volume	Volume/ Capacity	Average Delay (sec)	LOS
Bristol Street Interchange															
1	Anton Blvd/South Coast Plaza	Bristol St	Existing Traffic Signal	Costa Mesa	1	1500	152	0.10	--	--	1500	348	0.23	--	--
2	I-405 NB Off-Ramp/South Coast Plaza	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	1	1500	379	0.25	--	--	1500	248	0.17	--	--
3	I-405 NB On-Ramp (for NB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1.5	3000	1084	0.36	--	--	3000	1476	0.49	--	--
4	I-405 NB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized On-Ramp	Caltrans, Costa Mesa	1.5	3000	1084	0.36	--	--	3000	1476	0.49	--	--
5	I-405 SB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1.5	3000	1084	0.36	--	--	3000	1476	0.49	--	--
6	I-405 SB Off-Ramp & On-Ramp (for NB Bristol St)	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	1.5	3000	1084	0.36	--	--	3000	1476	0.49	--	--
Fairview Road Interchange															
1	I-405 NB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	1	1500	1007	0.67	--	--	1500	1081	0.72	--	--
2	I-405 SB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	1	1500	522	0.35	--	--	1500	628	0.42	--	--
3	South Coast Drive	I-405 NB Off-Ramp	Existing Traffic Signal	Caltrans, Costa Mesa	1	1500	867	0.58	--	--	1500	1144	0.76	--	--
Harbor Boulevard & Hyland Avenue Interchange															
1	I-405 NB On-Ramp/South Coast Dr	Hyland Ave	Existing Traffic Signal	Caltrans, Costa Mesa	1	1500	431	0.14	--	--	3000	427	0.14	--	--
2	I-405 SB On-Ramp (for SB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	647	0.43	--	--	1500	1144	0.76	--	--
3	I-405 NB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	1	1500	682	0.45	--	--	1500	478	0.32	--	--
4	I-405 NB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	867	0.58	--	--	1500	1000	0.67	--	--
5	I-405 SB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	1	1500	1393	0.46	--	--	3000	777	0.26	--	--
6	I-405 SB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized On-Ramp	Caltrans, Costa Mesa	1.5	3000	1393	0.46	--	--	3000	777	0.26	--	--
7	Gisler Ave	Harbor Blvd	Existing Traffic Signal	Costa Mesa	1.5	3000	1393	0.46	--	--	3000	777	0.26	--	--
8	Ikea Way	Susan St	Existing Traffic Signal	Costa Mesa	1.5	3000	1393	0.46	--	--	3000	777	0.26	--	--
Euclid Street & Ellis Avenue Interchange															
1	I-405 NB Ramps/Newhope St	Euclid St	Existing Traffic Signal	Caltrans, Fountain Valley	1	1500	431	0.14	--	--	1500	1144	0.76	--	--
2	Ellis Ave	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Fountain Valley	1	1500	647	0.43	--	--	1500	1144	0.76	--	--
Brookhurst Street & Talbert Avenue Interchange															
1	Slater Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	1	1500	647	0.43	--	--	1500	1144	0.76	--	--
2	I-405 NB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized On-Ramp	Caltrans, Fountain Valley	1	1500	682	0.45	--	--	1500	478	0.32	--	--
3	I-405 NB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	867	0.58	--	--	1500	1000	0.67	--	--
4	I-405 NB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	1379	0.92	--	--	1500	752	0.50	--	--
5	I-405 NB On-Ramp (for NB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	100	0.07	--	--	1500	214	0.14	--	--
6	I-405 SB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	753	0.50	--	--	1500	789	0.53	--	--
7	I-405 SB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	1152	0.77	--	--	1500	774	0.52	--	--
8	I-405 SB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Unsignalized Off-Ramp	Caltrans, Fountain Valley	1	1500	1152	0.77	--	--	1500	774	0.52	--	--
Magnolia Street & Warner Avenue Interchange															
1	Heil Ave	Magnolia St	Existing Traffic Signal	Westminster	1	1500	284	0.09	--	--	3000	150	0.05	--	--
2	I-405 NB On-Ramp (for SB Magnolia Ave)	Magnolia St	Unsignalized On-Ramp	Caltrans, Westminster	1	1500	259	0.17	--	--	1500	777	0.52	--	--
3	I-405 NB Off-Ramp (to NB Magnolia Ave)	Magnolia St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	627	0.42	--	--	1500	445	0.30	--	--
4	I-405 NB On-Ramp (for NB Magnolia Ave)	Magnolia St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	1102	0.73	--	--	1500	378	0.25	--	--
5	I-405 SB On-Ramp (for SB Magnolia Ave)	Magnolia St	Unsignalized Loop On-Ramp	Caltrans, Huntington Beach	1	1500	627	0.42	--	--	1500	445	0.30	--	--
6	I-405 SB Off-Ramp (to NB & SB Magnolia Ave)	Magnolia St	Existing Traffic Signal	Caltrans, Huntington Beach, Fountain Valley	1	1500	627	0.42	--	--	1500	445	0.30	--	--
7	Warner Ave	Magnolia St	Existing Traffic Signal	Fountain Valley, Huntington Beach	1	1500	99	0.99	63.1	E	1500	597	0.40	--	--
8	Warner Ave	I-405 SB On-Ramp (for EB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1	1500	1423	0.47	--	--	3000	762	0.25	--	--
9	Warner Ave	I-405 SB Off-Ramp (to EB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	690	0.46	--	--	1500	597	0.40	--	--
10	Warner Ave	I-405 NB Off-Ramp (to WB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	520	0.35	--	--	1500	878	0.59	--	--
11	Warner Ave	I-405 NB On-Ramp (for WB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1	1500	556	0.19	--	--	3000	888	0.30	--	--

Appendix ____ : No Built Condition (Year 2040) Arterial Interchange Analysis and Levels of Service

ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	Volume/ Capacity	Average Delay (sec)	LOS	Capacity	Volume	Volume/ Capacity	Average Delay (sec)	LOS
Beach Boulevard & Edinger Avenue Interchange															
1	McFadden Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Westminster	--	--	--	1.11	81.8	F	--	--	1.13	86.6	F
2	I-405 NB On-Ramp (for SB Beach Blvd)	Beach Blvd	Unsignalized On-Ramp	Caltrans, Westminster	1	1500	301	0.20	--	--	1500	291	0.19	--	--
3	I-405 NB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Off-Ramp	Caltrans, Westminster	1	1500	884	0.59	--	--	1500	1000	0.67	--	--
4	I-405 NB Off-Ramp (to SB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	759	0.51	--	--	1500	1078	0.72	--	--
5	I-405 NB On-Ramp (for NB Beach Blvd)	Beach Blvd	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	866	0.58	--	--	1500	1061	0.71	--	--
6	Center Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach	--	--	--	0.92	19.5	B	--	--	1.00	37.8	F*
7	Center Ave (Huntington Beach Mall)	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Huntington Beach	--	--	--	0.65	17.5	B	--	--	0.92	36.4	D
8	I-405 SB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	47	0.03	--	--	1500	167	0.11	--	--
9	Edinger Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach, Westminster	--	--	--	1.15	78.9	F*	--	--	1.11	79.4	F
10	Edinger Ave	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Huntington Beach	1	1500	1059	0.71	--	--	1500	803	0.54	--	--
Goldenwest Street & Bolsa Avenue Interchange															
1	I-405 NB On-Ramp (for NB Goldenwest St)	Goldenwest St	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	873	0.58	--	--	1500	947	0.63	--	--
2	Westminster Mall	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.39	6.8	A	--	--	0.42	10.4	B
3	Westminster Mall	Goldenwest St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.76	11.7	B	--	--	0.75	13.1	B
4	Bolsa Ave	Goldenwest St	Existing Traffic Signal	Huntington Beach, Westminster	--	--	--	0.80	38.2	D	--	--	1.04	72.3	F*
5	Bolsa Ave	I-405 SB On-Ramp (for EB Bolsa Ave)	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	351	0.23	--	--	1500	774	0.52	--	--
6	Bolsa Ave	I-405 SB Off-Ramp (to EB Bolsa Ave)	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.40	11.3	B	--	--	0.17	10.6	B
7	Bolsa Ave	I-405 NB Off-Ramp (to WB Bolsa Ave)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	908	0.61	--	--	1500	812	0.54	--	--
Springdale Street & Westminster Boulevard Interchange															
1	I-405 SB Off-Ramp	Springdale St	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.83	76.2	F	--	--	0.85	75.8	F
2	Westminster Blvd	Springdale St	Existing Traffic Signal	Westminster	--	--	--	0.84	44.1	D	--	--	1.00	65.9	F*
3	Westminster Blvd	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	2	3000	807	0.27	--	--	3000	1014	0.34	--	--
4	Westminster Blvd	I-405 SB Off-Ramp (to EB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	289	0.19	--	--	1500	245	0.16	--	--
5	Westminster Blvd	I-405 NB Off-Ramp (to WB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	666	0.44	--	--	1500	707	0.47	--	--
6	Westminster Blvd	I-405 NB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	2	3000	1008	0.34	--	--	3000	956	0.32	--	--
7	Westminster Blvd	I-405 NB Off-Ramp/Willow Ln	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.61	15.4	B	--	--	0.69	16.3	B
Bolsa Chica Road-Valley View Street & Garden Grove Boulevard Interchange															
1	Garden Grove Blvd	I-405 NB Off-Ramp/SR-22 EB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.94	60.4	E	--	--	1.03	75.8	F*
2	Garden Grove Blvd	Bolsa Chica Rd/Valley View St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.99	32.2	C	--	--	1.06	57.0	F*
3	I-405 SB On-Ramp (for SB Bolsa Chica Rd)	Bolsa Chica Rd	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	1074	0.72	--	--	1500	1288	0.86	--	--
4	I-405 SB Off-Ramp (to SB Bolsa Chica Rd)	Bolsa Chica Rd	Unsignalized Off-Ramp	Caltrans, Westminster	1	1500	1394	0.93	--	--	1500	1169	0.78	--	--
5	SR-22 WB/I-405 NB On-Ramp (for SB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	348	0.23	--	--	1500	477	0.32	--	--
6	SR-22 WB/I-405 NB On-Ramp (for NB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	769	0.51	--	--	1500	953	0.64	--	--
Seal Beach Boulevard Interchange															
1	I-405 NB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.80	31.0	C	--	--	0.94	44.8	D
2	I-405 SB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	1.18	81.6	F	--	--	1.31	100.5	F
Bear Street Interchange at SR-73															
1	SR-73 NB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.59	14.7	B	--	--	0.56	13.8	B
2	SR-73 SB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.52	13.6	B	--	--	0.63	15.9	B
Katella Avenue/Willow Street Interchange at I-605															
1	Katella Ave	I-605 NB On-Ramp (for WB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1.5	3000	1091	0.36	--	--	3000	1244	0.41	--	--
2	Katella Ave	I-605 NB On-Ramp (for EB Katella Ave)	Existing Traffic Signal	Caltrans, Los Alamitos, Orange County	--	--	--	0.75	3.2	A	--	--	0.87	7.0	A
3	Katella Ave	I-605 NB Off-Ramp (to EB Katella Ave)	Unsignalized Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1263	0.84	--	--	1500	818	0.55	--	--
4	Katella Ave	I-605 NB Off-Ramp (to WB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	83	0.06	--	--	1500	115	0.08	--	--
5	Katella Ave	I-605 SB On-Ramp (for WB Katella Ave)	Unsignalized Loop On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	600	0.40	--	--	1500	729	0.49	--	--
6	Katella Ave	I-605 SB Off-Ramp (to EB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1337	0.89	--	--	1500	1192	0.79	--	--
7	Katella Ave	I-605 SB On-Ramp (for EB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	231	0.15	--	--	1500	172	0.11	--	--
8	Willow St	I-605 SB Off-Ramp (to WB Willow St)	Unsignalized Off-Ramp	Caltrans, Long Beach	1	1500	608	0.41	--	--	1500	692	0.46	--	--

Notes: 1. Level of Service (LOS) analysis were conducted using Synchro 6.0 per 2000 Highway Capacity Manual. Analysis worksheets are included in Appendix.
 2. Ramp capacity assumptions for On-Ramp & Off-Ramp (with separate lanes on surface street): single lane = 1500 vph; single lane plus a shared lane or dual lanes = 3000 vph.
 3. F*: Due to excessive volume-to-capacity ratio (over 1.0), the intersection is expected to operate at LOS F.

Appendix ____ : Project Condition with Improvements (Year 2040) Arterial Interchange Analysis and Levels of Service

ID	Location		Traffic Control/Comments	Agency(s)	No. of Lanes	AM Peak Hour				PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	Volume/Capacity	Average Delay (sec)	LOS	Capacity	Volume	Volume/Capacity	Average Delay (sec)
Bristol Street Interchange														
1	Anton Blvd /South Coast Plaza	Bristol St	Existing Traffic Signal	Costa Mesa	2					C				
2	I-405 NB Off-Ramp/South Coast Plaza	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	2					C				
3	I-405 NB On-Ramp (for NB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	2					C				
4	I-405 NB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized On-Ramp	Caltrans, Costa Mesa	2					C				
5	I-405 SB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	2					C				
6	I-405 SB Off-Ramp & On-Ramp (for NB Bristol St)	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	2					C				
Fairview Road Interchange														
1	I-405 NB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	2					C				
2	I-405 SB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	2					C				
3	South Coast Drive	I-405 NB Off Ramp	Existing Traffic Signal	Caltrans, Costa Mesa	2					C				
Harbor Boulevard & Hyland Avenue Interchange														
1	I-405 NB On-Ramp/South Coast Dr	Hyland Ave	Existing Traffic Signal	Caltrans, Costa Mesa	2					C				
2	I-405 SB On-Ramp (for SB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	2					C				
3	I-405 NB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	2					C				
4	I-405 NB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	2					C				
5	I-405 SB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	2					C				
6	I-405 SB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized On-Ramp	Caltrans, Costa Mesa	2					C				
7	Gisler Ave	Harbor Blvd	Existing Traffic Signal	Costa Mesa	2					C				
8	Ikea Way	Susan St	Existing Traffic Signal	Costa Mesa	2					C				
Euclid Street & Ellis Avenue Interchange														
1	I-405 NB Ramps/Newhope St	Euclid St	Existing Traffic Signal	Caltrans, Fountain Valley	2	--	--	0.67	31.8	C	--	--	0.97	50.2
2	Ellis Ave (WB to SB On-Ramp)	I-405 SB Ramps (I-405 SB On-Ramp is for WB Ellis Ave)	Existing Traffic Signal	Caltrans, Fountain Valley	2	--	--	0.73	21.9	C	--	--	0.89	19.2
3	Ellis Ave (EB to SB On-Ramp)	I-405 SB On-Ramp (for EB Ellis Ave)	Proposed On-Ramp	Caltrans, Fountain Valley	2	3000	1479	0.49	--	--	3000	897	0.30	--
4	Ellis Ave	Pacific St	Proposed Traffic Signal	Fountain Valley	2	--	--	--	--	--	--	--	--	--
Brookhurst Street & Talbert Avenue Interchange														
1	Slater Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	2	--	--	1.05	59.8	F*	--	--	0.95	52.1
2	I-405 NB On-Ramp (for NB Brookhurst St)	Brookhurst St	Unsignalized On-Ramp	Caltrans, Fountain Valley	2	1.5	3000	431	0.14	--	3000	427	0.14	--
3 & 4	I-405 NB Off-Ramp (to NB & SB Brookhurst St)	Brookhurst St	Proposed Traffic Signal	Caltrans, Fountain Valley	2	--	--	0.66	14.8	B	--	--	0.72	19.0
4	I-405 NB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Part of Proposed Traffic Signal	Caltrans, Fountain Valley	2	--	--	--	--	--	--	--	--	--
5	I-405 NB On-Ramp (for NB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	2	1.5	3000	867	0.29	--	3000	1000	0.33	--
6	I-405 SB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	2	1.5	3000	1379	0.46	--	3000	752	0.25	--
7 & 8	I-405 SB Off-Ramp (to NB & SB Brookhurst St)	Brookhurst St	Proposed Traffic Signal	Caltrans, Fountain Valley	2	--	--	0.61	11.2	B	--	--	0.62	13.2
8	I-405 SB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Part of Proposed Traffic Signal	Caltrans, Fountain Valley	2	--	--	--	--	--	--	--	--	--
9	Talbert Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	2	--	--	1.18	97.0	F	--	--	1.04	64.3
10	Talbert Ave	I-405 SB On-Ramp (for EB Talbert Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	2	1.5	3000	1152	0.38	--	3000	774	0.26	--
Magnolia Street & Warner Avenue Interchange														
1	Heil Ave	Magnolia St	Existing Traffic Signal	Westminster	2	--	--	0.93	31.3	C	--	--	0.75	22.0
2	I-405 NB On-Ramp (for SB Magnolia St)	Magnolia St	Unsignalized On-Ramp	Caltrans, Westminster	2	1	1500	284	0.19	--	1500	150	0.10	--
3	I-405 NB Off-Ramp (to NB Magnolia St)	Magnolia St	Proposed Traffic Signal	Caltrans, Fountain Valley	2	--	--	0.52	1.3	A	--	--	0.83	8.7
4	I-405 NB On-Ramp (for NB Magnolia St)	Magnolia St	Part of Proposed Traffic Signal	Caltrans, Fountain Valley	2	--	--	--	--	--	--	--	--	--
5	I-405 SB On-Ramp (for SB Magnolia St)	Magnolia St	Part of Proposed Traffic Signal	Caltrans, Huntington Beach	2	--	--	--	--	--	--	--	--	--
6	I-405 SB Off-Ramp (to NB & SB Magnolia St)	Magnolia St	Existing Traffic Signal	Caltrans, Huntington Beach, Fountain Valley	2	--	--	0.85	11.6	B	--	--	0.80	12.9
7	Warner Ave	Magnolia St	Existing Traffic Signal	Fountain Valley, Huntington Beach	2	--	--	0.99	54.2	D	--	--	1.00	58.3
8	Warner Ave	I-405 SB On-Ramp (for EB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	2	1.5	3000	1423	0.47	--	3000	762	0.25	--
9	Warner Ave	I-405 SB Off-Ramp (to EB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	2	1	1500	690	0.46	--	1500	597	0.40	--
10	Warner Ave	I-405 NB Off-Ramp (to WB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	2	1	1500	520	0.35	--	1500	878	0.59	--
11	Warner Ave	I-405 NB On-Ramp (for WB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	2	1.5	3000	556	0.19	--	3000	888	0.30	--
Beach Boulevard & Edinger Avenue Interchange														
1	McFadden Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Westminster	2	--	--	1.09	78.2	F*	--	--	1.02	75.7
2	I-405 NB On-Ramp (for SB Beach Blvd)	Beach Blvd	Unsignalized On-Ramp	Caltrans, Westminster	2	--	--	--	--	--	--	--	--	--
3	I-405 NB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Proposed Traffic Signal (to NB Beach Blvd)	Caltrans, Westminster	2	--	--	--	--	--	--	--	--	--
4	I-405 NB Off-Ramp (to SB Beach Blvd)	Beach Blvd	Part of the Proposed Traffic Signal (for SB Beach Blvd)	Caltrans, Westminster	2	--	--	--	--	--	--	--	--	--
5	I-405 NB On-Ramp (for NB Beach Blvd)	Beach Blvd	Unsignalized Loop On-Ramp	Caltrans, Westminster	2	--	--	--	--	--	--	--	--	--
1-4	I-405 NB Ramps (for NB and SB Beach Blvd)	Beach Blvd	Proposed Traffic Signal	Caltrans, Westminster	2	--	--	0.77	15.6	B	--	--	0.86	19.0
5	Center Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach	2	--	--	0.91	18.3	B	--	--	0.95	26.6
6	Center Ave (Huntington Beach Mall)	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Huntington Beach	2	--	--	0.65	18.9	B	--	--	0.83	26.7
7	I-405 SB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	2	--	--	--	--	--	--	--	--	--
8	Edinger Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach, Westminster	2	--	--	1.06	62.9	F*	--	--	1.07	82.7
9	Edinger Ave	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Huntington Beach	2	1.5	3000	1059	0.35	--	3000	803	0.27	--

Appendix ____ : Project Condition with Improvements (Year 2040) Arterial Interchange Analysis and Levels of Service

ID	Location		Traffic Control/Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	Volume/Capacity	Average Delay (sec)	LOS	Capacity	Volume	Volume/Capacity	Average Delay (sec)	LOS
Goldenwest Street & Bolsa Avenue Interchange															
1	I-405 NB On-Ramp (for NB Goldenwest St)	Goldenwest St	Unsignalized Loop On-Ramp	Caltrans, Westminster	1.5	3000	873	0.29	--	--	3000	947	0.32	--	--
2	Westminster Mall	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.33	10.9	B	--	--	0.43	11.4	B
3	Westminster Mall	Goldenwest St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.69	12.1	B	--	--	0.69	9.9	A
4	Bolsa Ave	Goldenwest St	Existing Traffic Signal	Huntington Beach, Westminster	--	--	--	0.80	38.6	D	--	--	0.99	59.0	E
5	Bolsa Ave	I-405 SB On-Ramp (for EB Bolsa Ave)	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	351	0.23	--	--	1500	774	0.52	--	--
6	Bolsa Ave	I-405 SB Off-Ramp (to EB Bolsa Ave)	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.37	10.7	B	--	--	0.16	10.2	B
7	Bolsa Ave	I-405 NB Off-Ramp (to WB Bolsa Ave)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	908	0.61	--	--	1500	812	0.54	--	--
Option B															
2	Westminster Mall	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	
Springdale Street & Westminster Boulevard Interchange															
1	I-405 SB Off-Ramp	Springdale St	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.40	8.8	A	--	--	0.57	9.1	A
2	Westminster Blvd	Springdale St	Existing Traffic Signal	Westminster	--	--	--	0.93	49.4	D	--	--	1.00	60.7	F*
3	Westminster Blvd	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	1.5	3000	807	0.27	--	--	3000	1014	0.34	--	--
4	Westminster Blvd	I-405 SB Off-Ramp (to EB Westminster Blvd)	Proposed Stop-Controlled Off-Ramp	Caltrans, Westminster	1	1500	289	0.19	--	--	1500	245	0.16	--	--
Option A															
5 & 6	Westminster Blvd	I-405 NB Ramps (to WB & EB Westminster Blvd)	Proposed Traffic Signal	Caltrans, Westminster	--	--	--	0.73	24.5	C	--	--	0.71	19.8	B
7	Westminster Blvd	Willow Ln	Existing Traffic Signal (Removed I-405 NB Off-Ramp)	Westminster	--	--	--	0.63	16.4	B	--	--	0.67	14.6	B
Option B															
5	Westminster Blvd	I-405 NB Off-Ramp (to WB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	
6	Westminster Blvd	I-405 NB On-Ramp	Proposed Traffic Signal	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	
7	Westminster Blvd	I-405 NB Off-Ramp/Willow Ln	Existing Traffic Signal	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	
Bolsa Chica Road-Valley View Street & Garden Grove Boulevard Interchange															
1	Garden Grove Blvd	I-405 NB Off-Ramp/SR-22 EB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.93	49.5	D	--	--	0.97	48.7	D
2	Garden Grove Blvd	Bolsa Chica Rd/Valley View St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.97	25.0	C	--	--	1.03	44.7	F*
3 & 4	I-405 SB Ramps (to NB & SB Bolsa Chica Rd)	Bolsa Chica Rd	Proposed Traffic Signal	Caltrans, Westminster	--	--	--	0.85	15.5	B	--	--	0.85	10.8	B
4	I-405 SB Off-Ramp (to SB Bolsa Chica Rd)	Bolsa Chica Rd	Part of the Proposed Traffic Signal	Caltrans, Westminster	--	--	--	--	--	--	--	--	--	--	
5	SR-22 WB/I-405 NB On-Ramp (for SB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	348	0.23	--	--	1500	477	0.32	--	--
6	SR-22 WB/I-405 NB On-Ramp (for NB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	769	0.51	--	--	1500	953	0.64	--	--
Seal Beach Boulevard Interchange															
1	I-405 NB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.70	23.2	C	--	--	0.80	26.6	C
2	I-405 SB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.87	37.6	D	--	--	1.15	70.7	F*
Bear Street Interchange at SR-73															
1	SR-73 NB Ramps	Bear Street	Existing Traffic Signal	Costa Mesa	--	--	--	--	--	--	--	--	--	--	
2	SR-73 SB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	--	--	--	--	--	--	--	
Katella Avenue/Willow Street Interchange at I-605															
1	Katella Ave	I-605 NB On-Ramp (for WB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1.5	3000	1091	0.36	--	--	3000	1244	0.41	--	--
2	Katella Ave	I-605 NB On-Ramp (for EB Katella Ave)	Existing Traffic Signal	Caltrans, Los Alamitos, Orange County	--	--	--	0.75	3.2	A	--	--	0.87	7.0	A
3	Katella Ave	I-605 NB Off-Ramp (to EB Katella Ave)	Unsignalized Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1263	0.84	--	--	1500	818	0.55	--	--
4	Katella Ave	I-605 NB Off-Ramp (to WB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	83	0.06	--	--	1500	115	0.08	--	--
5	Katella Ave	I-605 SB On-Ramp (for WB Katella Ave)	Unsignalized Loop On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	600	0.40	--	--	1500	729	0.49	--	--
6	Katella Ave	I-605 SB Off-Ramp (to EB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1337	0.89	--	--	1500	1192	0.79	--	--
7	Katella Ave	I-605 SB On-Ramp (for EB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	231	0.15	--	--	1500	172	0.11	--	--
8	Willow St	I-605 SB Off-Ramp (to WB Willow St)	Unsignalized Off-Ramp	Caltrans, Long Beach	1	1500	608	0.41	--	--	1500	692	0.46	--	--

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Notes: 1. Level of Service (LOS) analysis were conducted using Synchro 6.0 per 2000 Highway Capacity Manual. Analysis worksheets are included in Appendix.
2. Ramp capacity assumptions for On-Ramp & Off-Ramp (with separate lanes on surface street); single lane = 1500 vph; single lane plus a shared lane or dual lanes = 3000 vph.
3. F*: Due to excessive volume-to-capacity ratio (over 1.0), the intersection is expected to operate at LOS F.

Appendix ____ : Project Condition without Improvements (Year 2040) Arterial Interchange Analysis and Levels of Service

ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour					
	East/West Street	North/South Street				Capacity	Volume	Volume/ Capacity	Average Delay (sec)	LOS	Capacity	Volume	Volume/ Capacity	Average Delay (sec)	LOS	
Bristol Street Interchange																
1	Anton Blvd/South Coast Plaza	Bristol St	Existing Traffic Signal	Costa Mesa	--	--	--			--	--					
2	I-405 NB Off-Ramp/South Coast Plaza	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.71	21.9	C	--	--	0.98	46.0	D	
3	I-405 NB On-Ramp (for NB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	152	0.10	--	--	1500	348	0.23	--	--	
4	I-405 NB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized On-Ramp	Caltrans, Costa Mesa	1	1500	379	0.25	--	--	1500	248	0.17	--	--	
5	I-405 SB On-Ramp (for SB Bristol St)	Bristol St	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1.5	3000	1084	0.36	--	--	3000	1476	0.49	--	--	
6	I-405 SB Off-Ramp & On-Ramp (for NB Bristol St)	Bristol St	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.67	17.2	B	--	--	1.05	32.0	F*	
Fairview Road Interchange																
1	I-405 NB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	1.15	56.6	F*	--	--	0.99	38.7	D	
2	I-405 SB Ramps	Fairview Rd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.99	25.7	C	--	--	0.75	26.6	C	
3	South Coast Drive	I-405 NB Off-Ramp	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.27	22.4	C				0.43	30.8	C
Harbor Boulevard & Hyland Avenue Interchange																
1	I-405 NB On-Ramp/South Coast Dr	Hyland Ave	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.52	7.9	A	--	--	0.67	10.1	B	
2	I-405 SB On-Ramp (for SB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	1007	0.67	--	--	1500	1081	0.72	--	--	
3	I-405 NB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.65	20.2	C	--	--	0.81	28.5	C	
4	I-405 NB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized Loop On-Ramp	Caltrans, Costa Mesa	1	1500	522	0.35	--	--	1500	628	0.42	--	--	
5	I-405 SB Off-Ramp	Harbor Blvd	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.67	18.9	B	--	--	0.80	16.7	B	
6	I-405 SB On-Ramp (for NB Harbor Blvd)	Harbor Blvd	Unsignalized On-Ramp	Caltrans, Costa Mesa	1.5	3000	1393	0.46	--	--	3000	777	0.26	--	--	
7	Gisler Ave	Harbor Blvd	Existing Traffic Signal	Costa Mesa	--	--	--	0.82	32.8	C	--	--	0.99	55.2	E	
8	Ikea Way	Susan St	Existing Traffic Signal	Costa Mesa	--	--	--	0.35	8.0	A	--	--	0.37	8.6	A	
Euclid Street & Ellis Avenue Interchange																
1	I-405 NB Ramps/Newhope St	Euclid St	Existing Traffic Signal	Caltrans, Fountain Valley	--	--	--	0.64	31.9	C	--	--	0.93	52.9	D	
2	Ellis Ave	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Fountain Valley	--	--	--	1.37	154.5	F	--	--	1.52	195.6	F	
Brookhurst Street & Talbert Avenue Interchange																
1	Slater Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	--	--	--	1.17	78.8	F*	--	--	1.01	64.5	F*	
2	I-405 NB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	431	0.14	--	--	3000	427	0.14	--	--	
3	I-405 NB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	647	0.43	--	--	1500	1144	0.76	--	--	
4	I-405 NB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	682	0.45	--	--	1500	478	0.32	--	--	
5	I-405 NB On-Ramp (for NB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	867	0.58	--	--	1500	1000	0.67	--	--	
6	I-405 SB On-Ramp (for SB Brookhurst St)	Brookhurst St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	1379	0.92	--	--	1500	752	0.50	--	--	
7	I-405 SB Off-Ramp (to NB Brookhurst St)	Brookhurst St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	100	0.07	--	--	1500	214	0.14	--	--	
8	I-405 SB Off-Ramp (to SB Brookhurst St)	Brookhurst St	Unsignalized Off-Ramp	Caltrans, Fountain Valley	1	1500	753	0.50	--	--	1500	789	0.53	--	--	
9	Talbert Ave	Brookhurst St	Existing Traffic Signal	Fountain Valley	--	--	--	1.42	128.7	F	--	--	1.12	85.3	F	
10	Talbert Ave	I-405 SB On-Ramp (for EB Talbert Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1	1500	1152	0.77	--	--	1500	774	0.52	--	--	
Magnolia Street & Warner Avenue Interchange																
1	Heil Ave	Magnolia St	Existing Traffic Signal	Westminster	--	--	--	0.89	37.0	D	--	--	0.78	22.4	C	
2	I-405 NB On-Ramp (for SB Magnolia Ave)	Magnolia St	Unsignalized On-Ramp	Caltrans, Westminster	1.5	3000	284	0.09	--	--	3000	150	0.05	--	--	
3	I-405 NB Off-Ramp (to NB Magnolia Ave)	Magnolia St	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	259	0.17	--	--	1500	777	0.52	--	--	
4	I-405 NB On-Ramp (for NB Magnolia Ave)	Magnolia St	Unsignalized Loop On-Ramp	Caltrans, Fountain Valley	1	1500	627	0.42	--	--	1500	445	0.30	--	--	
5	I-405 SB On-Ramp (for SB Magnolia Ave)	Magnolia St	Unsignalized Loop On-Ramp	Caltrans, Huntington Beach	1	1500	1102	0.73	--	--	1500	378	0.25	--	--	
6	I-405 SB Off-Ramp (to NB & SB Magnolia Ave)	Magnolia St	Existing Traffic Signal	Caltrans, Huntington Beach, Fountain Valley	--	--	--	0.73	11.0	B	--	--	0.95	25.9	C	
7	Warner Ave	Magnolia St	Existing Traffic Signal	Fountain Valley, Huntington Beach	--	--	--	1.04	64.7	F*	--	--	1.12	75.4	F*	
8	Warner Ave	I-405 SB On-Ramp (for EB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	1423	0.47	--	--	3000	762	0.25	--	--	
9	Warner Ave	I-405 SB Off-Ramp (to EB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	690	0.46	--	--	1500	597	0.40	--	--	
10	Warner Ave	I-405 NB Off-Ramp (to WB Warner Ave)	Unsignalized Loop Off-Ramp	Caltrans, Fountain Valley	1	1500	520	0.35	--	--	1500	878	0.59	--	--	
11	Warner Ave	I-405 NB On-Ramp (for WB Warner Ave)	Unsignalized On-Ramp	Caltrans, Fountain Valley	1.5	3000	556	0.19	--	--	3000	888	0.30	--	--	

Appendix ____ : Project Condition without Improvements (Year 2040) Arterial Interchange Analysis and Levels of Service

ID	Location		Traffic Control/ Comments	Agency(s)	No. of Lanes	AM Peak Hour					PM Peak Hour				
	East/West Street	North/South Street				Capacity	Volume	Volume/ Capacity	Average Delay (sec)	LOS	Capacity	Volume	Volume/ Capacity	Average Delay (sec)	LOS
Beach Boulevard & Edinger Avenue Interchange															
1	McFadden Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Westminster	--	--	--	1.15	94.5	F	--	--	1.14	92.3	F
2	I-405 NB On-Ramp (for SB Beach Blvd)	Beach Blvd	Unsignalized On-Ramp	Caltrans, Westminster	1	1500	301	0.20	--	--	1500	291	0.19	--	--
3	I-405 NB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Off-Ramp	Caltrans, Westminster	1	1500	884	0.59	--	--	1500	1000	0.67	--	--
4	I-405 NB Off-Ramp (to SB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	759	0.51	--	--	1500	1078	0.72	--	--
5	I-405 NB On-Ramp (for NB Beach Blvd)	Beach Blvd	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	866	0.58	--	--	1500	1061	0.71	--	--
6	Center Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach	--	--	--	0.95	19.8	B	--	--	1.04	44.7	F*
7	Center Ave (Huntington Beach Mall)	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Huntington Beach	--	--	--	0.66	17.5	B	--	--	0.92	36.7	D
8	I-405 SB Off-Ramp (to NB Beach Blvd)	Beach Blvd	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	47	0.03	--	--	1500	167	0.11	--	--
9	Edinger Ave	Beach Blvd	Existing Traffic Signal	Caltrans, Huntington Beach, Westminster	--	--	--	1.21	86.8	F	--	--	1.18	89.0	F
10	Edinger Ave	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Huntington Beach	1	1500	1059	0.71	--	--	1500	803	0.54	--	--
Goldenwest Street & Bolsa Avenue Interchange															
1	I-405 NB On-Ramp (for NB Goldenwest St)	Goldenwest St	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	873	0.58	--	--	1500	947	0.63	--	--
2	Westminster Mall	I-405 SB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.39	7.8	A	--	--	0.43	10.4	B
3	Westminster Mall	Goldenwest St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.81	13.2	B	--	--	0.79	12.8	B
4	Bolsa Ave	Goldenwest St	Existing Traffic Signal	Huntington Beach, Westminster	--	--	--	0.84	39.7	D	--	--	1.13	85.6	F
5	Bolsa Ave	I-405 SB On-Ramp (for EB Bolsa Ave)	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	351	0.23	--	--	1500	774	0.52	--	--
6	Bolsa Ave	I-405 SB Off-Ramp (to EB Bolsa Ave)	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.41	11.7	B	--	--	0.17	10.6	B
7	Bolsa Ave	I-405 NB Off-Ramp (to WB Bolsa Ave)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	908	0.61	--	--	1500	812	0.54	--	--
Springdale Street & Westminster Boulevard Interchange															
1	I-405 SB Off-Ramp	Springdale St	Stop-Controlled Off-Ramp	Caltrans, Westminster	--	--	--	0.85	80.9	F	--	--	0.85	76.3	F
2	Westminster Blvd	Springdale St	Existing Traffic Signal	Westminster	--	--	--	0.93	48.8	D	--	--	1.00	59.1	F*
3	Westminster Blvd	I-405 SB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	2	3000	807	0.27	--	--	3000	1014	0.34	--	--
4	Westminster Blvd	I-405 SB Off-Ramp (to EB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	289	0.19	--	--	1500	245	0.16	--	--
5	Westminster Blvd	I-405 NB Off-Ramp (to WB Westminster Blvd)	Unsignalized Loop Off-Ramp	Caltrans, Westminster	1	1500	666	0.44	--	--	1500	707	0.47	--	--
6	Westminster Blvd	I-405 NB On-Ramp	Unsignalized On-Ramp	Caltrans, Westminster	2	3000	1008	0.34	--	--	3000	956	0.32	--	--
7	Westminster Blvd	I-405 NB Off-Ramp/Willow Ln	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.69	18.5	B	--	--	0.78	20.6	C
Bolsa Chica Road-Valley View Street & Garden Grove Boulevard Interchange															
1	Garden Grove Blvd	I-405 NB Off-Ramp/SR-22 EB Ramps	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.96	62.1	E	--	--	1.03	75.8	F*
2	Garden Grove Blvd	Bolsa Chica Rd/Valley View St	Existing Traffic Signal	Caltrans, Westminster	--	--	--	0.99	30.6	C	--	--	1.06	57.0	F*
3	I-405 SB On-Ramp (for SB Bolsa Chica Rd)	Bolsa Chica Rd	Unsignalized Loop On-Ramp	Caltrans, Westminster	1	1500	1074	0.72	--	--	1500	1288	0.86	--	--
4	I-405 SB Off-Ramp (to SB Bolsa Chica Rd)	Bolsa Chica Rd	Unsignalized Off-Ramp	Caltrans, Westminster	1	1500	1394	0.93	--	--	1500	1169	0.78	--	--
5	SR-22 WB/I-405 NB On-Ramp (for SB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	348	0.23	--	--	1500	477	0.32	--	--
6	SR-22 WB/I-405 NB On-Ramp (for NB Valley View St)	Valley View St	Unsignalized On-Ramp	Caltrans, Garden Grove	1	1500	769	0.51	--	--	1500	953	0.64	--	--
Seal Beach Boulevard Interchange															
1	I-405 NB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	0.89	41.6	D	--	--	0.99	61.0	E
2	I-405 SB Ramps	Seal Beach Blvd	Existing Traffic Signal	Caltrans, Seal Beach	--	--	--	1.22	91.1	F	--	--	1.42	137.6	F
Bear Street Interchange at SR-73															
1	SR-73 NB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.59	14.5	B	--	--	0.56	13.8	B
2	SR-73 SB Ramps	Bear Street	Existing Traffic Signal	Caltrans, Costa Mesa	--	--	--	0.53	13.7	B	--	--	0.67	16.7	B
Katella Avenue/Willow Street Interchange at I-605															
1	Katella Ave	I-605 NB On-Ramp (for WB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1.5	3000	1091	0.36	--	--	3000	1244	0.41	--	--
2	Katella Ave	I-605 NB On-Ramp (for EB Katella Ave)	Existing Traffic Signal	Caltrans, Los Alamitos, Orange County	--	--	--	0.72	3.2	A	--	--	0.83	6.0	A
3	Katella Ave	I-605 NB Off-Ramp (to EB Katella Ave)	Unsignalized Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1263	0.84	--	--	1500	818	0.55	--	--
4	Katella Ave	I-605 NB Off-Ramp (to WB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	83	0.06	--	--	1500	115	0.08	--	--
5	Katella Ave	I-605 SB On-Ramp (for WB Katella Ave)	Unsignalized Loop On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	600	0.40	--	--	1500	729	0.49	--	--
6	Katella Ave	I-605 SB Off-Ramp (to EB Katella Ave)	Unsignalized Loop Off-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	1337	0.89	--	--	1500	1192	0.79	--	--
7	Katella Ave	I-605 SB On-Ramp (for EB Katella Ave)	Unsignalized On-Ramp	Caltrans, Los Alamitos, Orange County	1	1500	231	0.15	--	--	1500	172	0.11	--	--
8	Willow St	I-605 SB Off-Ramp (to WB Willow St)	Unsignalized Off-Ramp	Caltrans, Long Beach	1	1500	608	0.41	--	--	1500	692	0.46	--	--

Notes: 1. Level of Service (LOS) analysis were conducted using Synchro 6.0 per 2000 Highway Capacity Manual. Analysis worksheets are included in Appendix.
2. Ramp capacity assumptions for On-Ramp & Off-Ramp (with separate lanes on surface street): single lane = 1500 vph; single lane plus a shared lane or dual lanes = 3000 vph.
3. F*: Due to excessive volume-to-capacity ratio (over 1.0), the intersection is expected to operate at LOS F.

I-405 Mainline Annual Average Daily Traffic (AADT) and Truck Mainline AADT

Estimated I-405 ADT	2009	2020				2040			
		No Build	Alt 1	Alt 2	Alt 3	No Build	Alt 1	Alt 2	Alt 3
SR-73 to Brookhurst	307,000	333,000	357,000	374,000	383,000	351,000	391,000	419,000	435,000
Brookhurst to SR-22 East	257,000	276,000	296,000	310,000	314,000	288,000	321,000	344,000	352,000
SR-22 East to I-605	370,000	404,000	433,000	453,000	455,000	427,000	475,000	509,000	512,000

Estimated I-405 Truck ADT	2009	2020				2040			
		No Build	Alt 1	Alt 2	Alt 3	No Build	Alt 1	Alt 2	Alt 3
SR-73 to Brookhurst (3.5% of	10,745	11,655	12,495	13,090	13,405	12,285	13,685	14,665	15,225
Brookhurst to SR-22 East (3.5% of total)	8,995	9,660	10,360	10,850	10,990	10,080	11,235	12,040	12,320
SR-22 East to I-605 (3% of total)	11,100	12,120	12,990	13,590	13,650	12,810	14,250	15,270	15,360

I-405 Level of Service and Speed

Existing 2009 Morning Peak Period 6:00-9:00AM Segment		Northbound						Southbound					
		Volume		LOS		Speed		Volume		LOS		Speed	
		GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst		26,192	2,412	C	B	65	65	31,071	2,916	F	D	45	55
Brookhurst to SR-22 East		22,406	4,319	F	D	43	53	19,854	3,730	F	D	17	47
SR-22 East to I-605		35,278	4,347	F	D	35	55	33,763	3,421	F	D	31	51

Existing 2009 Evening Peak Period 3:00-7:00PM Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	34,560	5,748	F	F	30	40	32,419	4,395	D	D	53	63
Brookhurst to SR-22 East	30,428	6,349	F	F	45	55	28,550	6,011	F	E	50	60
SR-22 East to I-605	44,102	6,236	F	F	47	55	48,422	6,123	F	F	45	55

Existing 2009 Non-Peak Periods Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	67,777	3,015	A	A	65	65	82,682	1,092	A	A	65	65
Brookhurst to SR-22 East	62,674	5,827	A	A	65	65	69,570	3,742	A	A	65	65
SR-22 East to I-605	83,026	2,658	A	A	65	65	109,525	1,359	A	A	65	65

2020 Baseline - No Build Morning Peak Period 6:00-9:00AM Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	32,118	5,353	F	F	45	45	40,538	6,756	F	F	13	13
Brookhurst to SR-22 East	28,402	7,100	F	F	16	16	28,473	7,118	F	F	14	14
SR-22 East to I-605	40,538	12,017	F	F	24	40	40,828	12,114	F	F	19	39

I-405 Level of Service and Speed

SR-73 to Brookhurst	47,597	7,933	F	F	25	25	43,672	7,279	F	F	39	39
Brookhurst to SR-22 East	40,466	10,116	F	F	12	12	36,322	9,080	F	F	15	15
SR-22 East to I-605	54,225	16,072	F	F	25	42	53,808	15,933	F	F	22	43

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	108,047	4,838	A	A	65	65	100,987	2,589	A	A	65	65
Brookhurst to SR-22 East	92,545	10,283	B	A	65	65	83,067	9,230	A	A	65	65
SR-22 East to I-605	120,008	22,897	A	A	65	65	123,563	18,212	A	A	65	65

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	32,118	5,353	F	F	58	58	40,538	6,756	F	F	18	18
Brookhurst to SR-22 East	29,585	5,917	F	F	44	44	29,660	5,932	F	F	33	33
SR-22 East to I-605	41,437	11,118	F	F	43	53	41,738	11,204	F	F	42	52

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	47,597	7,933	F	F	42	42	43,672	7,279	F	F	52	52
Brookhurst to SR-22 East	42,152	8,430	F	F	33	33	37,835	7,567	F	F	44	44
SR-22 East to I-605	55,427	14,870	F	F	45	54	54,994	14,747	F	F	45	54

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	108,047	4,838	A	A	65	65	100,987	2,589	A	A	65	65
Brookhurst to SR-22 East	95,972	6,855	A	A	65	65	86,143	6,153	A	A	65	65
SR-22 East to I-605	123,290	19,614	A	A	65	65	125,974	15,801	A	A	65	65

I-405 Level of Service and Speed

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	32,118	5,353	F	F	60	60	40,538	6,756	F	F	22	22
Brookhurst to SR-22 East	30,430	5,072	F	F	62	62	30,507	5,085	F	F	51	51
SR-22 East to I-605	42,605	9,950	F	D	53	60	42,914	10,027	F	F	51	57

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	47,597	7,933	F	F	47	47	43,672	7,279	F	F	56	56
Brookhurst to SR-22 East	43,356	7,226	F	F	56	56	38,916	6,486	F	F	56	56
SR-22 East to I-605	56,989	13,308	F	D	55	62	56,544	13,197	F	F	55	60

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	108,047	4,838	A	A	65	65	100,987	2,589	A	A	65	65
Brookhurst to SR-22 East	98,421	4,407	A	A	65	65	88,341	3,956	A	A	65	65
SR-22 East to I-605	130,148	12,756	A	A	65	65	129,124	12,650	A	A	65	65

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express
SR-73 to Brookhurst	29,338	8,132	D	C	64	65	38,320	8,974	F	C	37	65
Brookhurst to SR-22 East	27,930	7,572	F	C	58	65	27,179	8,413	F	C	45	65
SR-22 East to I-605	43,020	9,534	F	D	47	65	43,407	9,534	F	D	43	65

I-405 Level of Service and Speed

2020 Alternative 3 Evening Peak Period 3:00-7:00PM Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express
SR-73 to Brookhurst	43,509	12,021	F	C	58	65	40,056	10,894	F	C	62	65
Brookhurst to SR-22 East	39,313	11,270	F	C	51	65	34,320	11,082	F	C	51	65
SR-22 East to I-605	57,524	12,772	F	D	48	65	56,968	12,772	F	D	46	65

2020 Alternative 3 Non-Peak Periods Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express
SR-73 to Brookhurst	108,370	4,515	A	A	65	65	101,504	2,072	A	A	65	65
Brookhurst to SR-22 East	98,714	4,113	A	A	65	65	88,605	3,692	A	A	65	65
SR-22 East to I-605	138,618	4,287	A	A	65	65	137,521	4,253	A	A	65	65

2040 Baseline - No Build Morning Peak Period 6:00-9:00AM Segment		Northbound						Southbound					
		Volume		LOS		Speed		Volume		LOS		Speed	
		GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst		36,435	6,072	F	F	21	21	47,664	7,944	F	F	5	5
Brookhurst to SR-22 East		32,962	8,241	F	F	5	5	34,789	8,697	F	F	5	5
SR-22 East to I-605		46,769	14,094	F	F	7	15	48,862	14,792	F	F	5	10

2040 Baseline - No Build Evening Peak Period 3:00-7:00PM		Northbound						Southbound					
		Volume		LOS		Speed		Volume		LOS		Speed	
		GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	55,511	9,252	F	F	10	10	49,529	8,255	F	F	20	20	
Brookhurst to SR-22 East	46,350	11,588	F	F	5	5	41,082	10,270	F	F	6	6	
SR-22 East to I-605	63,221	19,070	F	F	7	15	60,857	18,282	F	F	8	19	

2040 Baseline - No Build Non-Peak Periods	Northbound			Southbound		
	Volume	LOS	Speed	Volume	LOS	Speed

I-405 Level of Service and Speed

Segment	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	126,013	5,642	A	A	65	65	114,530	2,937	A	A	65	65
Brookhurst to SR-22 East	106,002	11,778	C	A	65	65	93,954	10,439	B	A	65	65
SR-22 East to I-605	139,877	27,412	B	A	65	65	139,804	21,078	B	A	65	65

2040 Alternative 1 Morning Peak Period 6:00-9:00AM Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	36,435	6,072	F	F	38	38	47,664	7,944	F	F	6	6
Brookhurst to SR-22 East	34,336	6,867	F	F	19	19	36,238	7,248	F	F	11	11
SR-22 East to I-605	47,899	12,964	F	F	19	28	50,069	13,584	F	F	13	20

2040 Alternative 1 Evening Peak Period 3:00-7:00PM Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	55,511	9,252	F	F	18	18	49,529	8,255	F	F	34	34
Brookhurst to SR-22 East	48,281	9,656	F	F	12	12	42,794	8,559	F	F	24	24
SR-22 East to I-605	64,756	17,536	F	F	19	27	62,304	16,835	F	F	23	32

2040 Alternative 1 Non-Peak Periods Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	126,013	5,642	A	A	65	65	114,530	2,937	A	A	65	65
Brookhurst to SR-22 East	109,928	7,852	A	A	65	65	97,433	6,960	A	A	65	65
SR-22 East to I-605	144,023	23,265	B	A	65	65	142,745	18,136	A	A	65	65

2040 Alternative 2 Morning Peak Period 6:00-9:00AM Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	36,435	6,072	F	F	44	44	47,664	7,944	F	F	7	7
Brookhurst to SR-22 East	35,317	5,886	F	F	45	45	37,273	6,212	F	F	31	31

I-405 Level of Service and Speed

SR-22 East to I-605	49,252	11,612	F	F	29	39	51,484	12,170	F	F	21	27
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Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	55,511	9,252	F	F	22	22	49,529	8,255	F	F	39	39
Brookhurst to SR-22 East	49,661	8,277	F	F	35	35	44,016	7,336	F	F	50	50
SR-22 East to I-605	66,585	15,707	F	F	31	40	64,063	15,077	F	F	34	40

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV	GP	HOV
SR-73 to Brookhurst	126,013	5,642	A	A	65	65	114,530	2,937	A	A	65	65
Brookhurst to SR-22 East	112,732	5,048	A	A	65	65	99,919	4,474	A	A	65	65
SR-22 East to I-605	150,560	16,729	B	A	65	65	146,321	14,561	A	A	65	65

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express
SR-73 to Brookhurst	34,375	8,132	F	C	53	65	46,635	8,974	F	C	14	65
Brookhurst to SR-22 East	33,632	7,572	F	C	38	65	35,073	8,413	F	C	25	65
SR-22 East to I-605	51,329	9,534	F	D	22	65	54,119	9,534	F	D	14	65

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express
SR-73 to Brookhurst	52,742	12,021	F	C	36	65	46,890	10,894	F	C	50	65
Brookhurst to SR-22 East	46,668	11,270	F	C	29	65	40,270	11,082	F	C	43	65
SR-22 East to I-605	69,519	12,772	F	D	22	65	66,367	12,772	F	D	24	65

I-405 Level of Service and Speed

Segment	Northbound						Southbound					
	Volume		LOS		Speed		Volume		LOS		Speed	
	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express	GP	Express
SR-73 to Brookhurst	126,390	5,266	A	A	65	65	115,118	2,349	A	A	65	65
Brookhurst to SR-22 East	113,069	4,711	B	A	65	65	100,217	4,176	A	A	65	65
SR-22 East to I-605	162,270	5,019	B	A	65	65	156,055	4,826	A	A	65	65

I-405 Vehicle Miles Traveled

Estimated I-405 Daily VMT (rounded to 1000s)	2009	2020				2040			
		No Build	Alt 1	Alt 2	Alt 3	No Build	Alt 1	Alt 2	Alt 3
SR-73 to Brookhurst	1,053,000	1,142,000	1,225,000	1,283,000	1,314,000	1,204,000	1,341,000	1,437,000	1,492,000
Brookhurst to SR-22 East	1,796,000	1,929,000	2,069,000	2,167,000	2,195,000	2,013,000	2,244,000	2,405,000	2,460,000
SR-22 East to I-605	1,214,000	1,325,000	1,420,000	1,486,000	1,492,000	1,401,000	1,558,000	1,670,000	1,679,000
Daily VMT	4,063,000	4,396,000	4,714,000	4,936,000	5,001,000	4,618,000	5,143,000	5,512,000	5,631,000

Appendix I

Corridor Drawings

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	HEET No.	TOTAL SHEETS
12,7	Ora, LA	22,73, 405,605	Var	1	30
REGISTERED CIVIL ENGINEER			DATE		
PLANS APPROVAL DATE					
<p>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</p>					
PARSONS 2201 DUPONT DRIVE SUITE 200 IRVINE, CA 92612			ORANGE COUNTY TRANSPORTATION AUTHORITY 550 SOUTH MAIN STREET ORANGE, CA 92863		

REGISTERED CIVIL ENGINEER	DATE
	
PLANS APPROVAL DATE	
THE STATE OF CALIFORNIA OR ITS OFFICERS AGENTS SHALL NOT BE RESPONSIBLE FOR ANY ACTS OR OMISSIONS OF THE REGISTERED CIVIL ENGINEER.	

THE STATE OF CALIFORNIA OR ITS OFFICERS
AGENTS SHALL NOT BE RESPONSIBLE FOR
THE ACCURACY OR COMPLETENESS OF SCANNED
PIES OF THIS PLAN SHEET.

RSONS
01 DUPONT DRIVE
ITE 200
VINE, CA 92612 ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

MATCH LINE STA 646+50 SEE SHEET L-2

ALTERNATIVE 1 LAYOUT L-1

SCALE 1"=100'

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION CONSULTANT FUNCTIONAL SUPERVISOR

Guttmann®

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	CONSULTANT FUNCTIONAL SUPERVISOR	CALCULATED-DESIGNED BY	REVISED BY
Caltrans		CHECKED BY	DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => p0035942

RELATIVE BORDER SCALE
IS IN INCHES

A horizontal number line with four tick marks labeled 0, 1, 2, and 3 from left to right. The segments between the tick marks are equal in length.

UNIT 2994

PROJECT NUMBER & PHASE

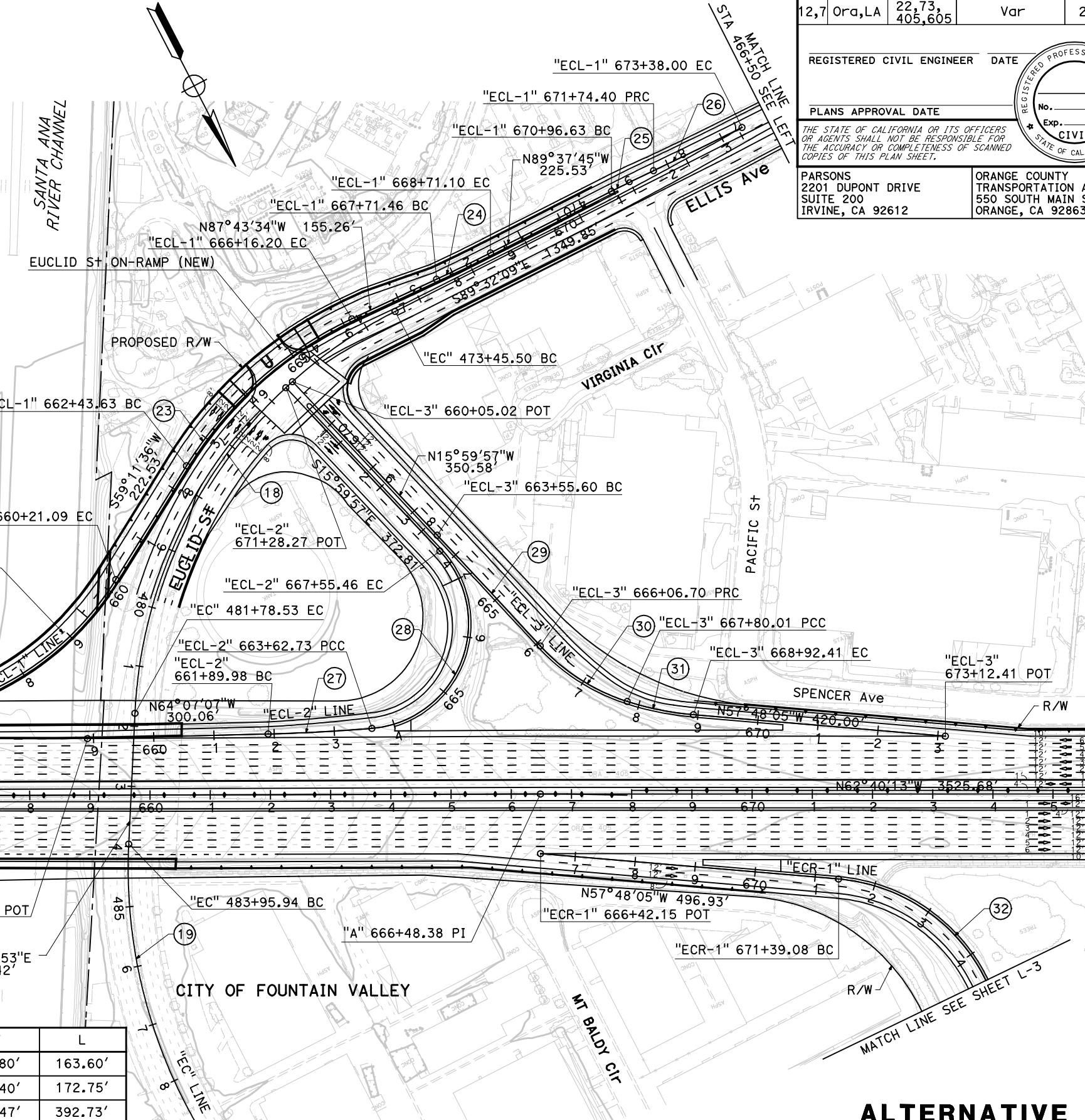
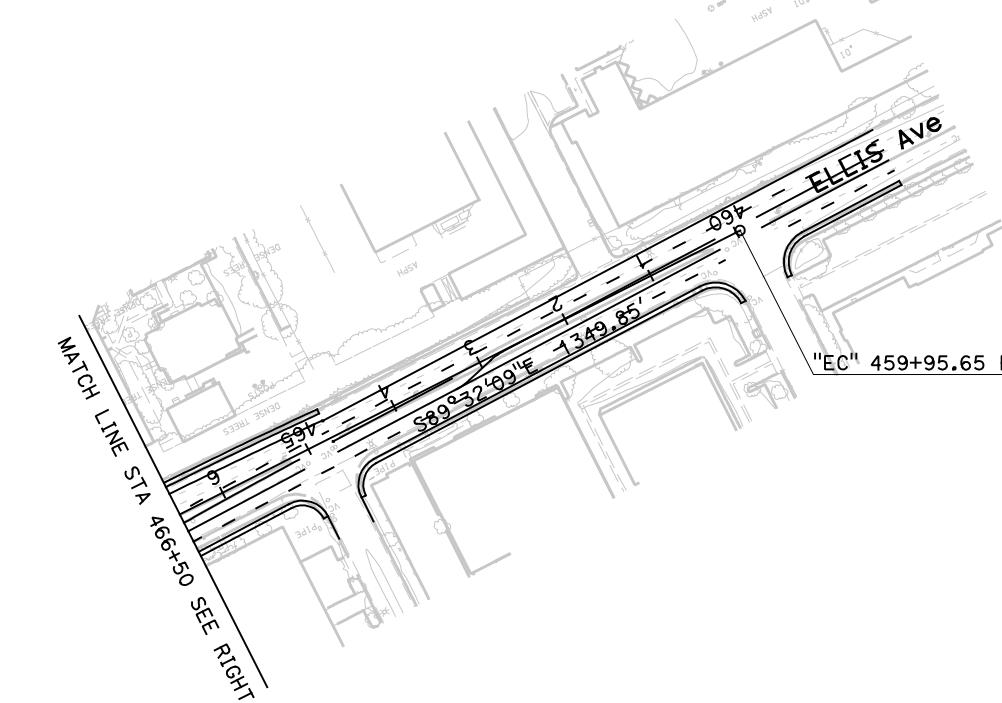
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LAST REVISION 0-00-00 DATE PLOTTED => 3/8/2011
TIME PLOTTED => 6:15:36 PM

No.	R	Δ	T	L
(18)	790.00'	60°24'58"	459.94'	833.02'
(19)	850.00'	73°47'26"	638.09'	1094.70'
(21)	3000.00'	5°34'23"	146.01'	291.80'
(22)	490.00'	51°06'55"	234.32'	437.14'
(23)	645.30'	33°04'50"	191.64'	372.57'
(24)	3000.00'	1°54'11"	49.83'	99.64'
(25)	2791.17'	1°35'47"	38.89'	77.77'

No.	R	Δ	T	L
(26)	7000.00'	1°20'21"	81.80'	163.60'
(27)	3000.00'	3°17'57"	86.40'	172.75'
(28)	175.00'	128°34'52"	363.47'	392.73'
(29)	20000.00'	0°43'10"	125.55'	251.10'
(30)	335.00'	29°38'29"	88.64'	173.31'
(31)	500.00'	12°52'49"	56.44'	112.40'
(32)	300.00'	102°24'12"	373.15'	536.18'

MATCH LINE STA 646+50 SEE SHEET L-1



ALTERNATIVE 1 LAYOUT L-2

SCALE 1"=100'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12,7	Ora, LA	22,73, 405,605	Var	2	30
REGISTERED CIVIL ENGINEER			DATE	 No. _____ Exp. _____ CIVIL STATE OF CALIFORNIA	
PLANS APPROVAL DATE			THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.		
PARSONS 2201 DUPONT DRIVE SUITE 200 IRVINE, CA 92612			ORANGE COUNTY TRANSPORTATION AUTHORITY 550 SOUTH MAIN STREET ORANGE, CA 92863		

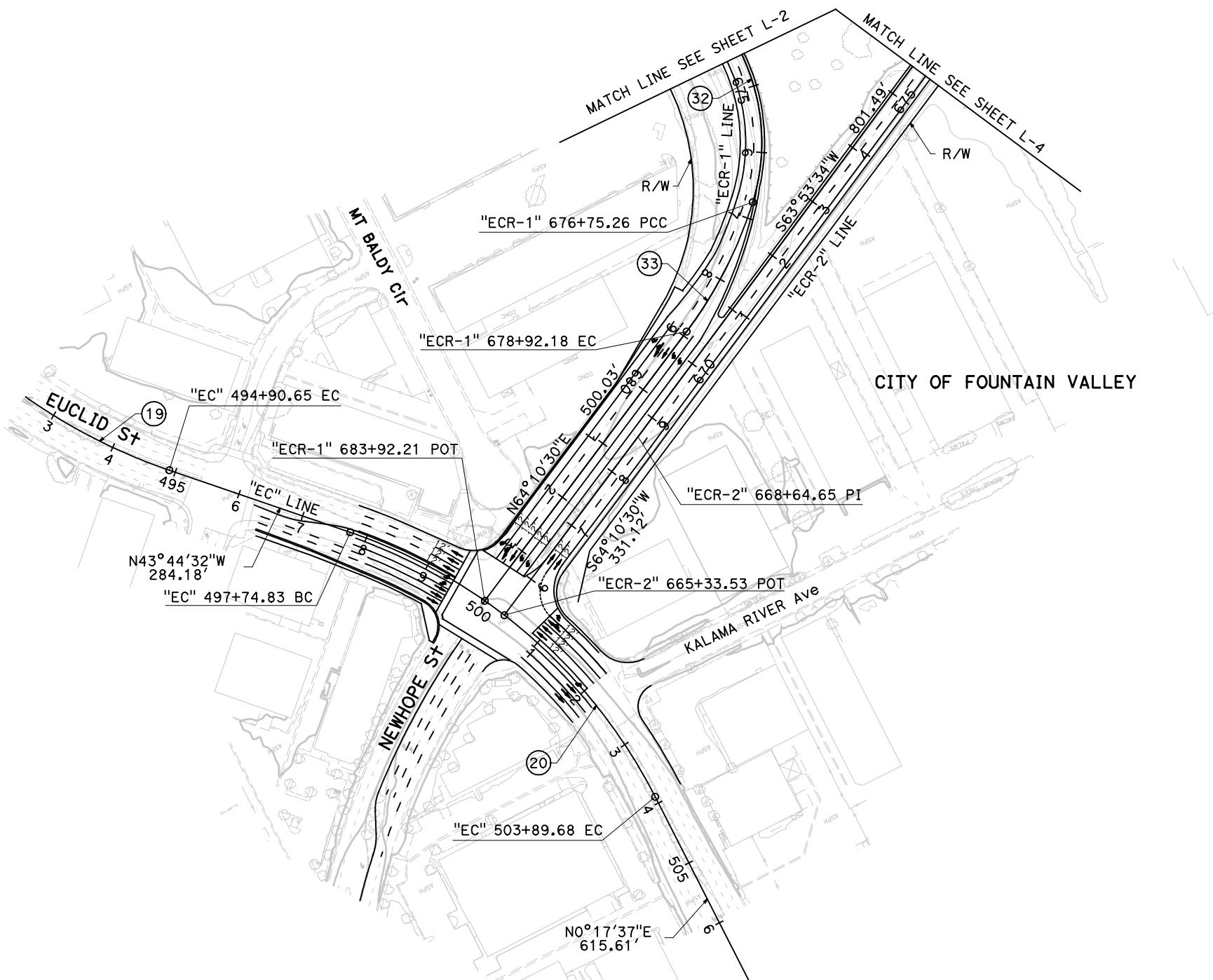
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12,7	Ora, LA	22,73, 405,605	Var	3	30

REGISTERED CIVIL ENGINEER DATE
 REGISTERED PROFESSIONAL ENGINEER No. _____ Exp. _____ STATE OF CALIFORNIA CIVIL

PLANS APPROVAL DATE
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

PARSONS
 2201 DUPONT DRIVE
 SUITE 200
 IRVINE, CA 92612

ORANGE COUNTY
 TRANSPORTATION AUTHORITY
 SUITE 200
 550 SOUTH MAIN STREET
 ORANGE, CA 92863



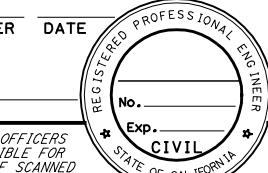
CURVE DATA

No.	R	Δ	T	L
(19)	850.00'	73°47'26"	638.09'	1094.70'
(20)	800.00'	44°02'09"	323.51'	614.86'
(32)	300.00'	102°24'12"	373.15'	536.18'
(33)	635.00'	19°34'23"	109.53'	216.92'

**ALTERNATIVE 1
LAYOUT
L-3**

SCALE 1"=100'

Caltrans®



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	Var	4	30

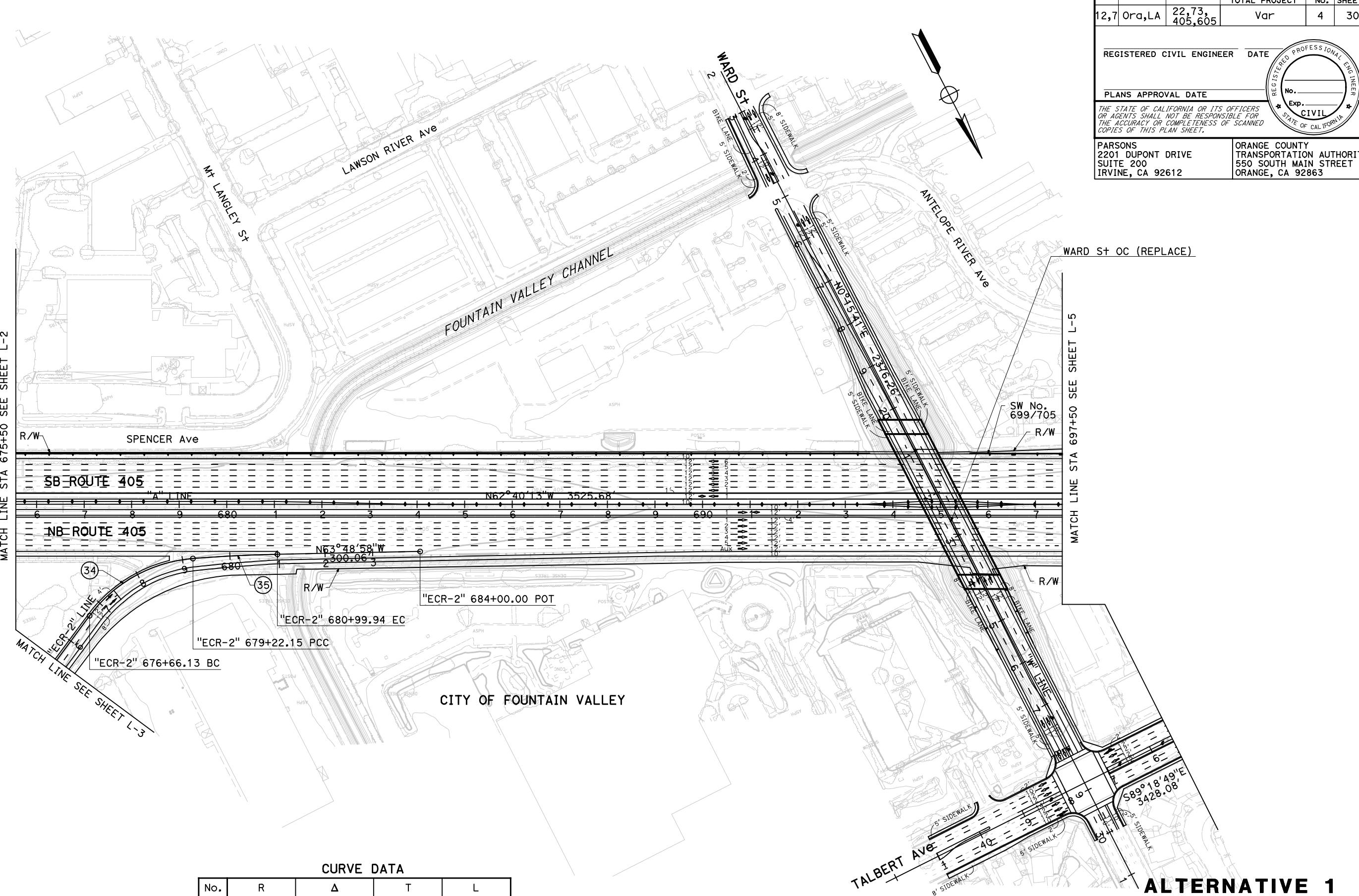
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

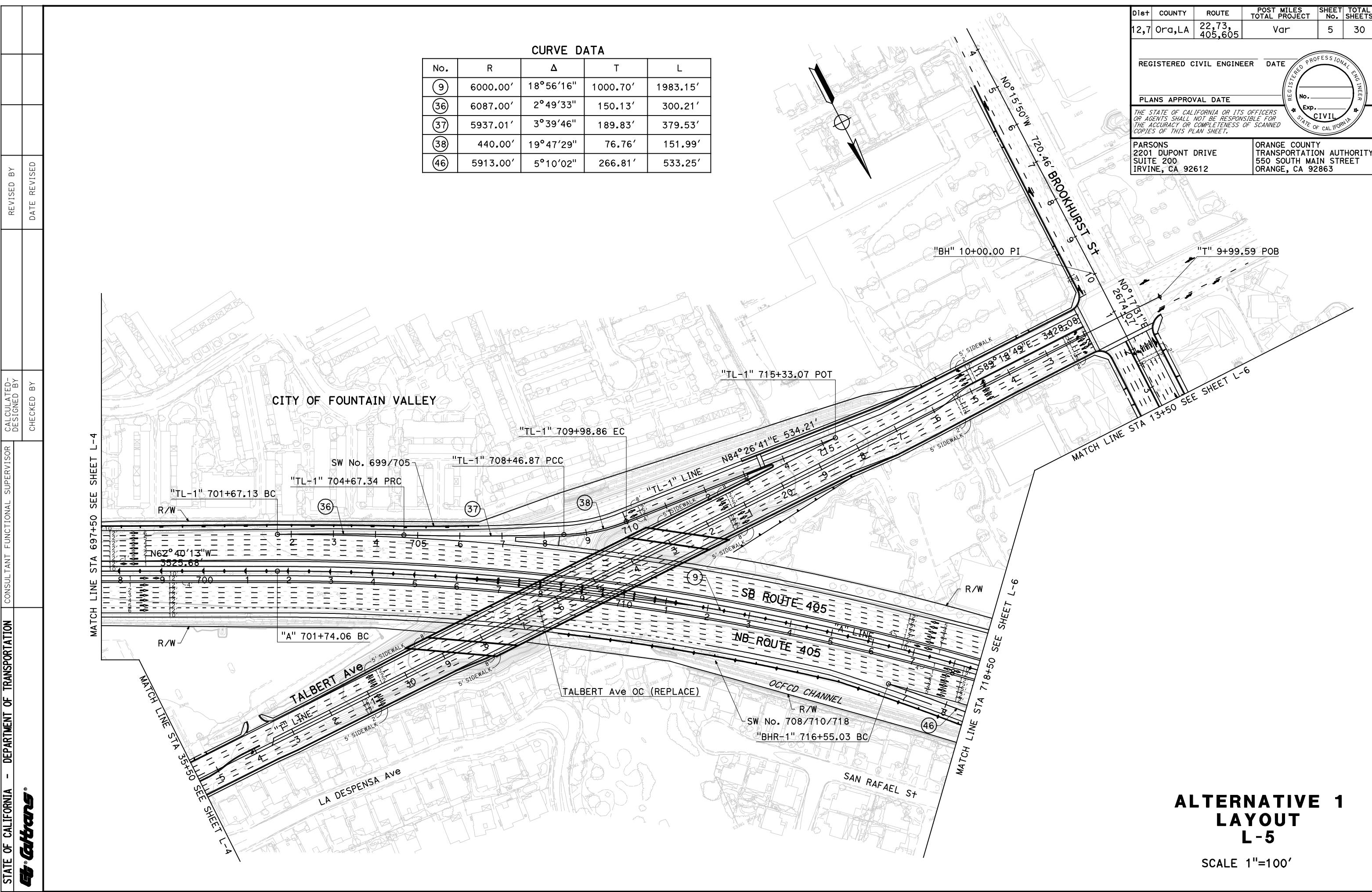
PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863



**ALTERNATIVE 1
LAYOUT
L-4**

SCALE 1"=100'



ALTERNATIVE 1 LAYOUT L-6

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION CONSULTANT FUNCTIONAL SUPERVISOR CALCULATED-DESIGNED BY CHECKED BY REVISED BY DATE REVISED

MATCH LINE STA 718+50 SEE SHEET L-5

MATCH LINE STA 13+50 SEE SHEET L-5

MATCH LINE STA 740+50 SEE SHEET L-7

CITY OF FOUNTAIN VALLEY

TOIYABE ST

"BHL-2" 723+74.97 POT

"BHL-2" 725+69.51 BC

"BHL-2" 728+83.82 EC

"BHL-1" 736+47.58 PCC

"BHL-1" 737+34.74 EC

"BHL-1" 729+01.96 PCC

"BHL-1" 727+34.52 PCC

"A" 732+40.44 PI

"BHL-2" 731+53.24 BC

"BHL-2" 734+60.51 EC

"BHL-1" 727+77.58 POT

"BHL-1" 725+77.64 BC

"BHL-1" 721+57.21 EC

"BHL-1" LINE

SB ROUTE 405

NB ROUTE 405

"BHR-2" 727+29.33 PCC

"BHR-2" 730+31.49 EC

"BHR-2" 728+63.16 PCC

"BHR-2" 733+01.65 POT

"BHR-1" 721+88.28 PCC

"BHR-1" 725+25.12 EC

"BHR-1" 727+28.38 BC

"BHR-1" 719+31.40 POT

"BHR-1" 719+41.94 BC

"BHR-1" 732+73.98 POT

"BHR-1" 730+88.57 EC

"BHR-1" 727+14.00 BC

"BHR-1" 725+14.00 BC

"BHR-1" 722+14.00 BC

"BHR-1" 720+14.00 BC

"BHR-1" 718+14.00 BC

"BHR-1" 716+14.00 BC

"BHR-1" 714+14.00 BC

"BHR-1" 712+14.00 BC

"BHR-1" 710+14.00 BC

"BHR-1" 708+14.00 BC

"BHR-1" 706+14.00 BC

"BHR-1" 704+14.00 BC

"BHR-1" 702+14.00 BC

"BHR-1" 700+14.00 BC

"BHR-1" 698+14.00 BC

"BHR-1" 696+14.00 BC

"BHR-1" 694+14.00 BC

"BHR-1" 692+14.00 BC

"BHR-1" 690+14.00 BC

"BHR-1" 688+14.00 BC

"BHR-1" 686+14.00 BC

"BHR-1" 684+14.00 BC

"BHR-1" 682+14.00 BC

"BHR-1" 680+14.00 BC

"BHR-1" 678+14.00 BC

"BHR-1" 676+14.00 BC

"BHR-1" 674+14.00 BC

"BHR-1" 672+14.00 BC

"BHR-1" 670+14.00 BC

"BHR-1" 668+14.00 BC

"BHR-1" 666+14.00 BC

"BHR-1" 664+14.00 BC

"BHR-1" 662+14.00 BC

"BHR-1" 660+14.00 BC

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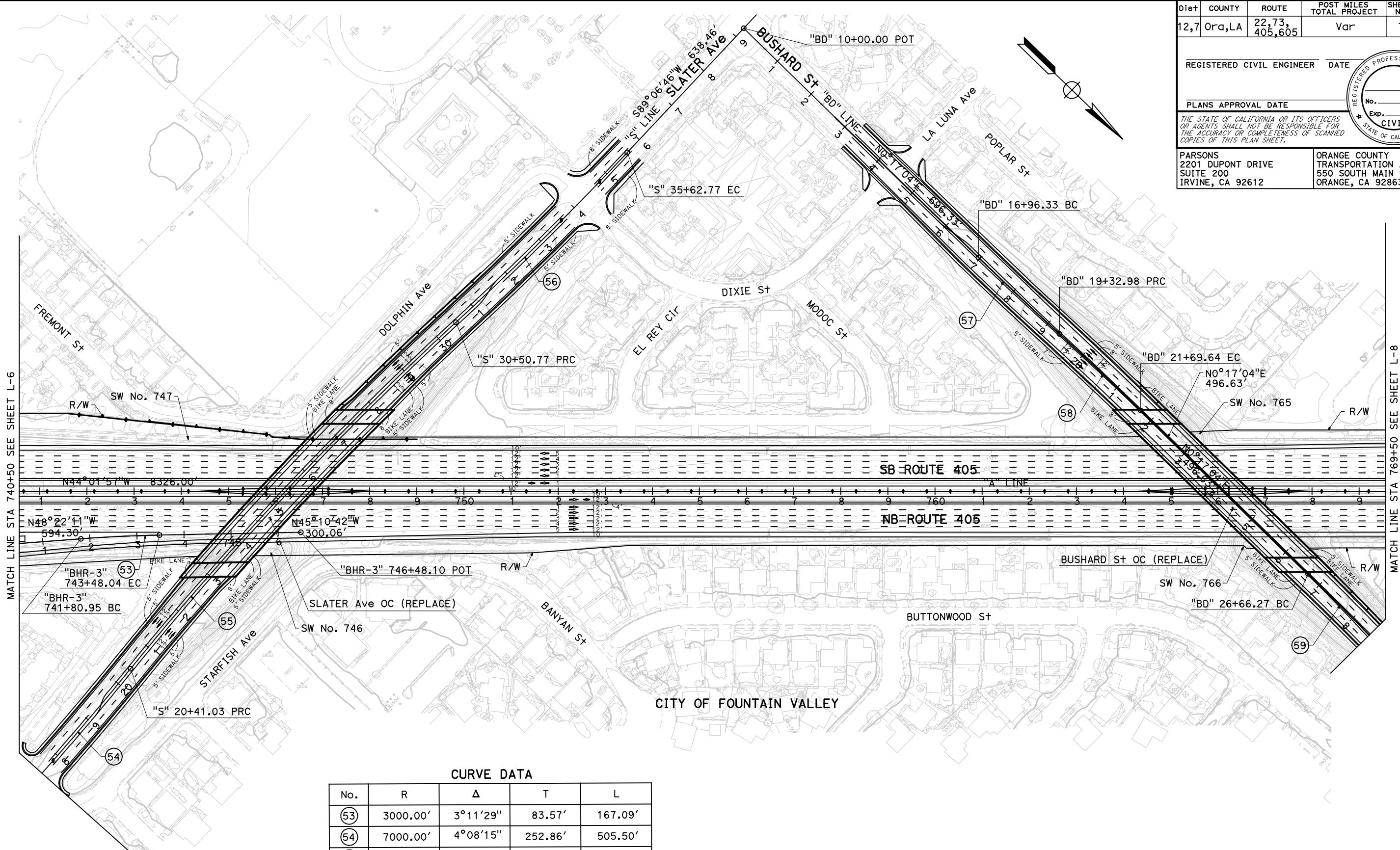
"BHR-1" 66+14.00 BC

"BHR-1" 64+14.00 BC

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ALTERNATIVE 1 LAYOUT L-6

SCALE 1"=100'



**ALTERNATIVE 1
LAYOUT
L-7**

SCALE 1"=100'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12,7	ORA, LA	22,73, 405,605	Var	7	30

REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
THE STATE OF CALIFORNIA OR ITS OFFICERS
OR AGENTS SHALL NOT BE RESPONSIBLE FOR
THE ACCURACY OR COMPLETENESS OF SCANNED
COPIES OF THIS PLAN SHEET.

PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

REGISTERED PROFESSIONAL ENGINEER
No. _____
Exp. _____
CIVIL
STATE OF CALIFORNIA

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora, LA	22,73, 405,605	Var	9	30

REGISTERED CIVIL ENGINEER DATE

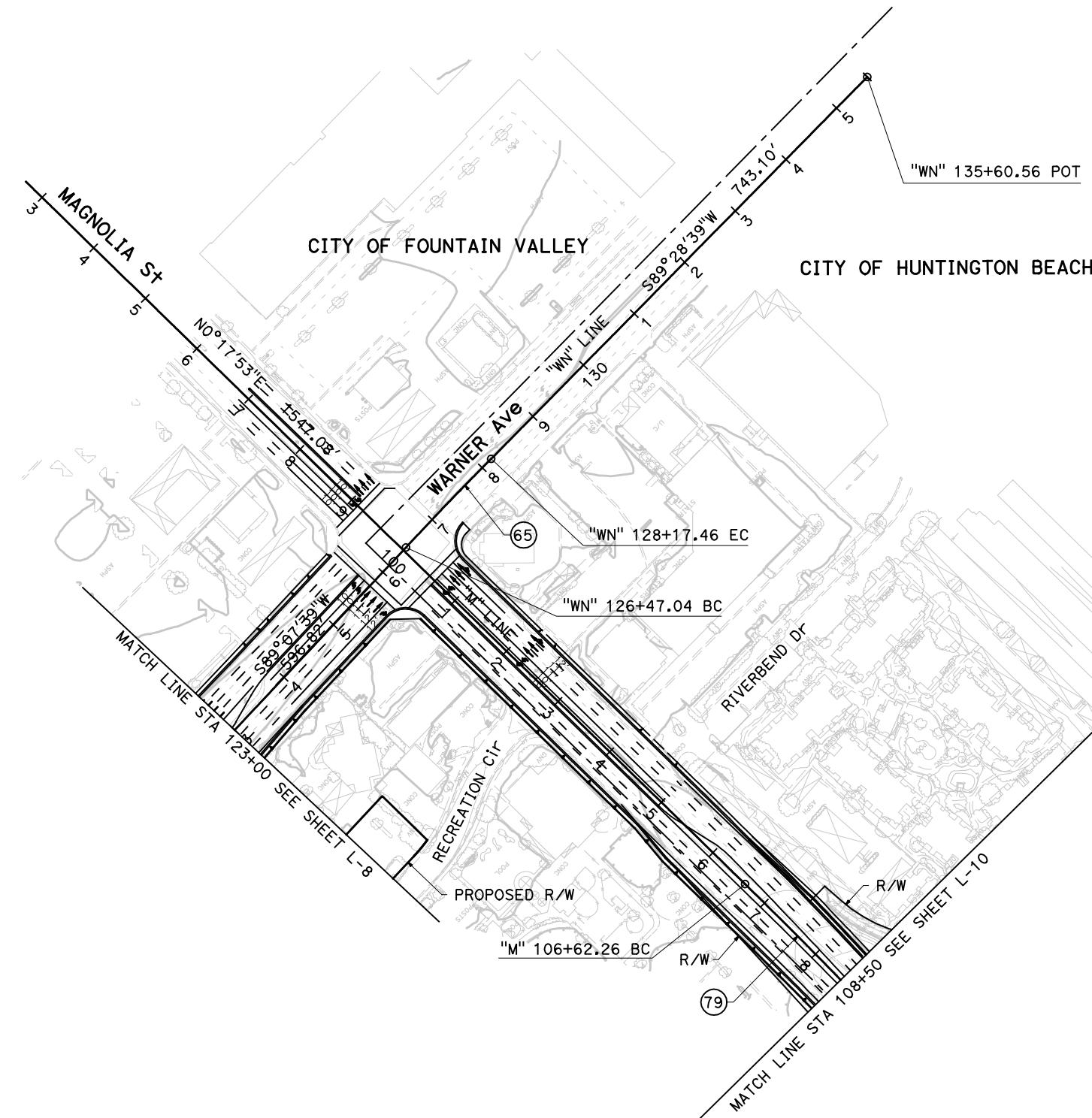
PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

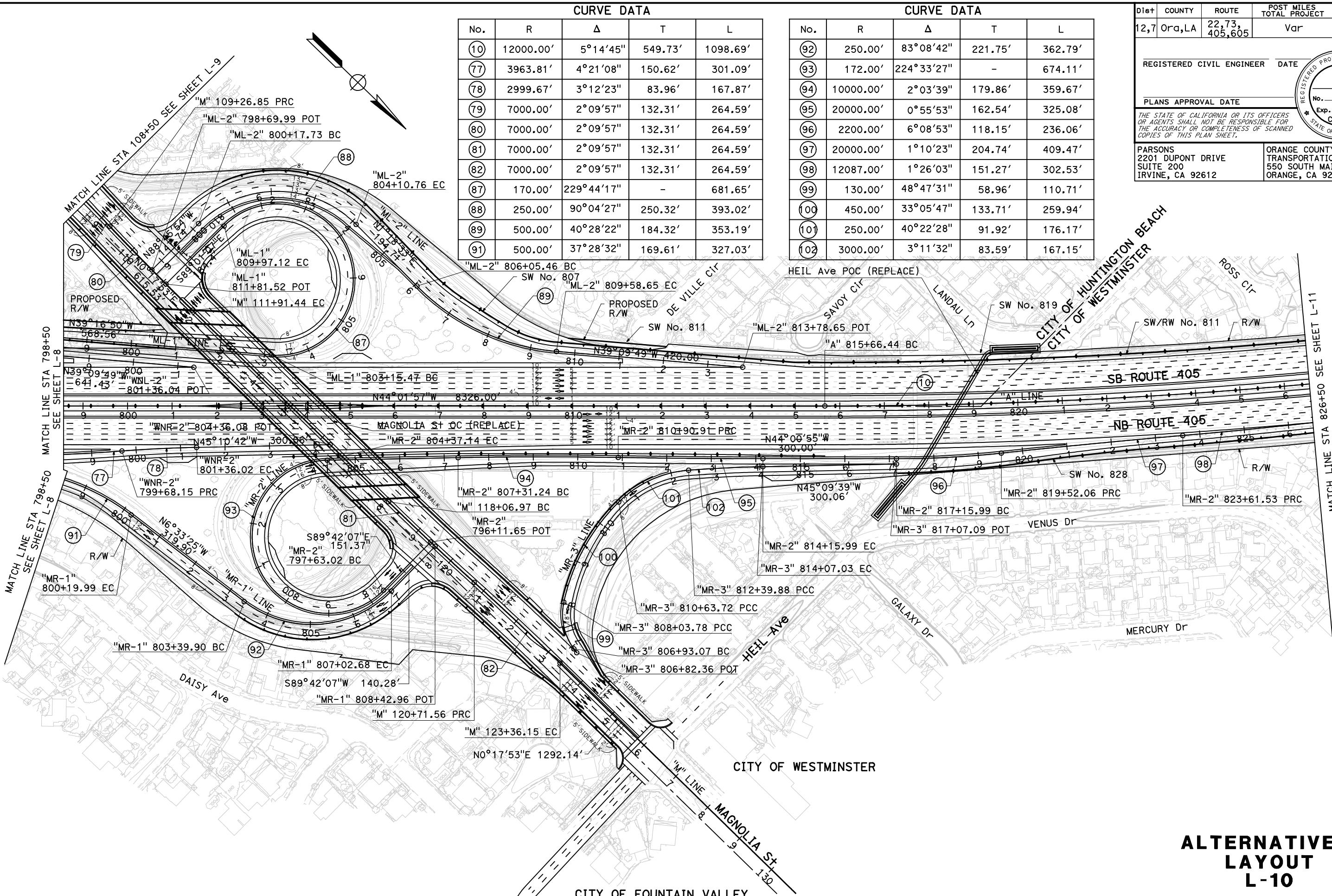
ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

REGISTERED PROFESSIONAL ENGINEER
No. _____
Exp. _____
CIVIL
STATE OF CALIFORNIA



**ALTERNATIVE 1
LAYOUT
L-9**

SCALE 1"=100'



ALTERNATIVE 1 LAYOUT L-10

SCALE 1"=100'

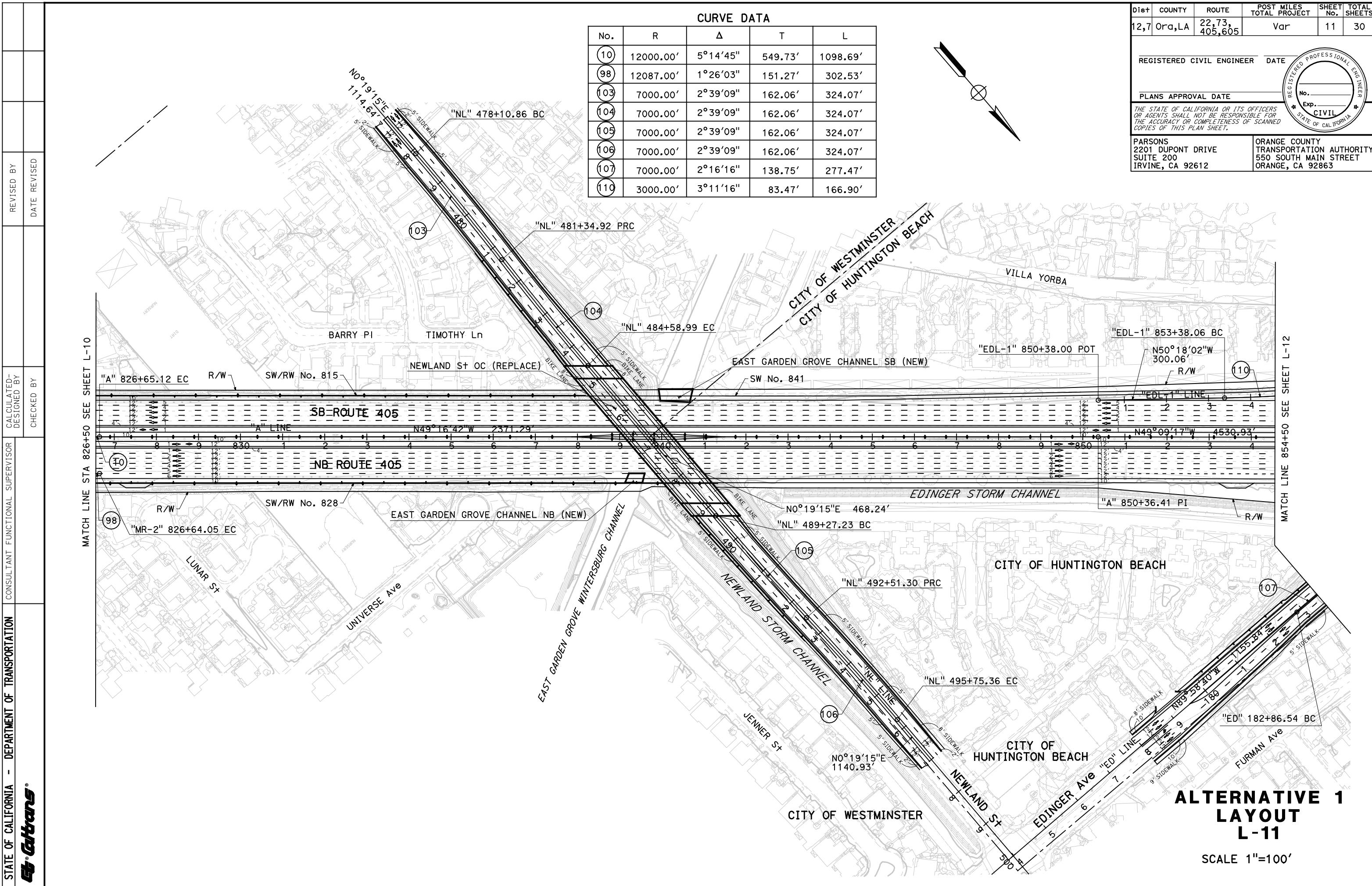
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12,7	ORA, LA	22,73, 405,605	Var	10	30

REGISTERED CIVIL ENGINEER DATE
PLANS APPROVAL DATE
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

PARSONS
2201 DUPONT DRIVE
SUITE 200
IRVINE, CA 92612

ORANGE COUNTY
TRANSPORTATION AUTHORITY
550 SOUTH MAIN STREET
ORANGE, CA 92863

SEE SHEET L-11



ALTERNATIVE 1 LAYOUT L-11

SCALE 1"=100'

BORDER LAST REVISED 7/2/2010

USERNAME => p0035942
DGN FILE => ALT 1 Layout Sheets.dgn

RELATIVE BORDER SCALE
IS IN INCHES

A horizontal number line with tick marks at 0, 1, 2, and 3. The segments between the tick marks are equal in length.

UNIT 2994

PROJECT NUMBER & PHASE

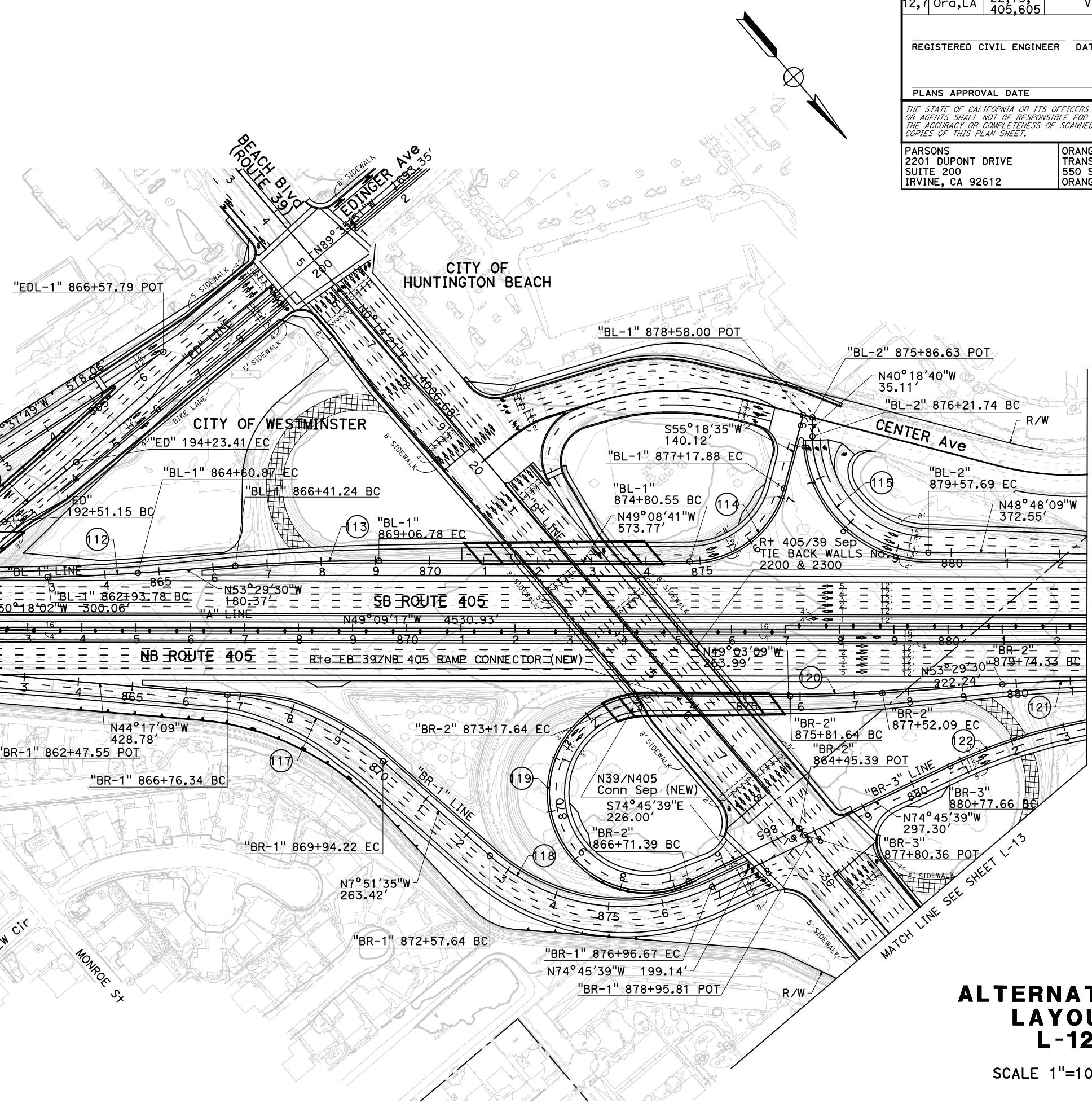
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MATCH LINE STA 854+50 SEE SHEET L-11

CALCULATED BY
DESIGNED BY
CHECKED BY

CURVE DATA

No.	R	Δ	T	L
107	7000.00'	2°16'16"	138.75'	277.47'
08	7000.00'	0°28'51"	29.38'	58.75'
09	7000.00'	1°24'36"	86.13'	172.26'
10	3000.00'	3°11'16"	83.47'	166.90'
111	600.00'	29°08'32"	155.97'	305.18'
12	3000.00'	3°11'29"	83.57'	167.10'
13	3500.00'	4°20'49"	132.83'	265.54'
14	180.00'	75°32'44"	139.49'	237.33'
15	216.00'	89°06'49"	212.68'	335.95'
17	500.00'	36°25'34"	164.52'	317.88'
18	376.00'	66°54'04"	248.40'	439.03'
19	180.00'	205°42'30"	-	646.25'
20	2200.00'	4°26'21"	85.27'	170.45'
21	3000.00'	3°11'29"	83.57'	167.10'
22	1000.00'	21°16'20"	187.80'	371.27'



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora, LA	22,73, 405,605	Var	12	30
REGISTERED CIVIL ENGINEER			DATE	 No. _____ Exp. _____ CIVIL STATE OF CALIFORNIA	
PLANS APPROVAL DATE			THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.		
PARSONS 2201 DUPONT DRIVE SUITE 200 IRVINE, CA 92612			ORANGE COUNTY TRANSPORTATION AUTHORITY 550 SOUTH MAIN STREET ORANGE, CA 92863		

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12,7	Ora,LA	22,73, 405,605	Var	13	30

REGISTERED CIVIL ENGINEER DATE
 REGISTERED PROFESSIONAL ENGINEER
 No. _____ Exp. _____
 STATE OF CALIFORNIA
 CIVIL

PLANS APPROVAL DATE
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PARSONS
 2201 DUPONT DRIVE
 SUITE 200
 IRVINE, CA 92612

ORANGE COUNTY
 TRANSPORTATION AUTHORITY
 550 SOUTH MAIN STREET
 ORANGE, CA 92863

